

THE RAILWAY GAZETTE

A Journal of Management, Engineering and Operation
INCORPORATING

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DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders 1939, No. 1440

TO CALLERS AND TELEPHONERS

In view of the restoration of summer time, beginning on Monday, February 26, and until further notice, our office hours will be:—

Mondays to Fridays - 9 a.m. till 5 p.m.

Saturdays - 9 a.m. till 12.30 p.m.

Beginning on March 2, the office will be closed on the first Saturday in every month until November 2, inclusive

With the object of conserving paper by avoiding the return of unsold copies, readers are advised in the interests of all concerned to place a regular order for THE RAILWAY GAZETTE either with their newsagent or direct with the Publisher

Railway Statistical Blackout

THE greatly modified form in which the reports and accounts of the British railways are being issued in respect of 1939 is the result of instructions to the companies by the Minister of Transport. These instructions will later be embodied in Statutory Rules & Orders under the general defence emergency powers wielded by the Crown, and will cover those companies whose accounts may be issued before publication of the Order. Matters which have been omitted include details of capital expenditure, receipts and expenditure in respect of railway working, and all references to subsidiary businesses, maintenance charges, and the whole of the statistical returns which usually form the second part of the accounts. Under the same powers an Order, dated February 9, has just been made public extending from 60 days to 90 days the period within which the companies must render their accounts. This amendment of the obligation imposed on railway companies by subsection (3) of section 1 of the Railway Companies (Accounts & Returns) Act, 1911, has become necessary because of the length of the discussions leading to the financial agreement with the Government, before which it was impossible to issue the accounts in a final form.

* * *

Transport "C" Stockholders' Position

In view of the large interest of his company in the "C" stock of the London Passenger Transport Board, the disappointment expressed by Mr. John F. Heaton in his speech from the chair at the annual meeting of Thomas Tilling Limited is understandable. But he was not on very strong ground when he suggested that the basic year selected for the Government guarantee to London Transport—that ended June 30, 1939—is inequitable and that the L.P.T.B. in this respect should have been treated on all fours with the main-line railways. That would have guaranteed the "C" stockholders a higher rate of interest, but it would have disregarded the fact that the transport board is suffering much reduced calls upon it by reason of evacuation and similar war measures, whereas the railways are being worked at high pressure. The Minister of Transport has indicated that in present conditions the transport board is probably more of a liability than an asset for the pool. In any event, since its proportion of the pool is fixed, it will benefit directly from the increased earnings of the other partners. The removal, by the Stock Exchange Committee, of the minimum price for the "C" stock will allow the market quotation to find a level more commensurate with earnings and prospects. An interim dividend at the rate of 1½ per cent. was announced on Wednesday. (See page 275.)

* * *

Irish Railway Valuations

The case affecting the valuations made on railway undertakings in Eire by the Commissioner of Valuation, which Circuit Judge Davitt referred to the Supreme Court for decision on certain matters (see THE RAILWAY GAZETTE of January 26, page 135), on January 22 came again before the Circuit Judge. In accordance with the Supreme Court answers to the case he stated, he upheld the appeal of the Great Southern and Great Northern Railway Companies against valuations fixed on their property in Eire. The valuation on the Great Southern Railways made by the Commissioner of Valuation in Eire was £183,083, and, by taking the tenants' capital into account in accordance with the judgment based on the High Court decision, this amount was reduced to £35,656, the sum which the company contended was the correct amount. Similarly, the

valuation of the Great Northern Railway in Eire was reduced from £17,500 to £7,113. Costs were awarded to the companies against the Commissioner of Valuation. It will be recalled that the Chairman of the Great Southern Railways, at the yearly meeting held in March, 1939, said that it was the intention of the directors to recommend the payment of dividends for the year 1938 on the 4 per cent. guaranteed stock if and when the assets became available and the financial condition of the company justified such recommendation. As a result of the decision of the Circuit Judge, the Great Southern Railways Company has applied to the various County Councils concerned for refund of the amounts overcharged in rates during the past four years. In one case the Secretary of the County Council was given authority to negotiate to have the refund spread over three years as it was estimated that the amount involved, if paid in one year, would mean an increase of 7d. in the £ on the rates.

* * * *

Overseas Railway Traffics

Traffic receipts of the Buenos Ayres Western have again been higher and in the 32nd and 33rd weeks of the current financial year have improved by 94,000 pesos. Over the same period the traffics of the Buenos Ayres Great Southern have risen by 101,000 pesos, and the decrease on the year for that line is now no more than 286,000 pesos. On the other hand, the Central Argentine has sustained a further setback—of 1,820,550 pesos—over the fortnight and the Entre Rios takings are lower by 77,900; Buenos Ayres & Pacific are down 76,000 pesos.

	No. of Weekly Week Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease
Buenos Ayres & Pacific*	33rd 1,780	— 20	41,323	— 962
Buenos Ayres Great Southern*	33rd 3,316	— 125	72,486	— 286
Buenos Ayres Western*	33rd 930	— 6	22,645	+ 2,015
Central Argentine*	33rd 1,648	— 927	57,501	— 2,108

	£	Inc. or Decrease	£	Inc. or Decrease
Canadian Pacific	6th 592,800	+ 153,000	3,667,000	+ 830,600
Bombay, Baroda & Central India	47th 274,570	— 26,250	7,606,950	+ 86,250

* Traffic receipts in thousands of pesos.

Central Uruguay receipts for the 32nd and 33rd weeks show an advance of £13,828 and Antofagasta traffics are higher by £6,680 over the period, during which there was a 3-day holiday in the Bolivian section. In the 4th and 5th weeks of their years, the Great Western of Brazil gained £4,200 and Leopoldina improved its position by £7,563; the San Paulo (Brazil) advance was of £14,493.

* * * *

Liverpool Overhead Railway Company

During the year 1939 the number of passengers carried was approximately 594,000 more than in 1938, resulting in an increase in traffic receipts of £5,342. Season ticket takings fell by £279; the total increase in receipts from passengers was £5,091 at £75,492; first class were £501 higher and third class £2,572 greater. In workmen's tickets there was an advance of £2,018. Working expenses increased by £4,418 but the operating ratio was slightly lower at 93.28 per cent. as compared with 93.72 per cent. Operating results for three years are:—

	1937	1938	1939
	£	£	£
Gross receipts	68,486	70,542	75,605
Revenue expenditure ..	63,130	66,112	7,053
Miscellaneous receipts ..	5,657	5,955	5,919
Total net income	11,013	10,385	10,994
Debt interest	6,755	6,755	6,755
Carried forward	Dr. 11,164	Dr. 7,534	Dr. 3,295

The company has 38 electric motor-coaches and 19 trailers.

Coal and Transport

The gas industry is dependent on the coalfields of Britain for its raw material and uses all modern forms of surface transport. One company alone, serving part of London, had a fleet of 19 colliers at the outbreak of war and charters many others in the course of the year. In addition to this, gas company undertakings make heavy demands on the resources of the railway companies, and today, thanks to the modernisation of their plant and technical improvements over many years, are substantial contributors to the war effort through the by-products which supply explosives and many synthetic materials. It was a happy thought, therefore, of the Minister of Supply to arrange for a body of people interested to visit the works of the Gas Light & Coke Company at Beckton on Friday of last week and witness one section of this great industry which, to most people appears of only domestic interest. Most of the coal for these works comes by sea and nearly 2½ million tons have been unloaded in one year. Some idea of the size of the plant can be gathered from the fact that to handle all the material and carry out the various transportation services within the works themselves there are no less than 100 miles of railway lines, and railway carriages and 30 locomotives are used for taking the staff and visitors round the works.

* * * *

Special Steamer Booking Facilities at Vancouver

Owing to a fire, which destroyed the Canadian Pacific Railway Pacific coastwise headquarters at Vancouver, Pier C—a part of the \$6,000,000 deep sea pier, dock, and offices—has been adapted for coastwise traffic, and a new booking office has been built for this service. As it is one of the busiest on the C.P.R. during the summer months, this office has been specially equipped for issuing a wide variety of tickets to ports throughout the Washington (U.S.A.) and Canadian coastline, and for the reservation of the many different kinds of accommodation available in the fleet of steamers serving those ports. The principal features in the equipment are seven specially designed ticket cases arranged as a battery, and a large berth-reservation counter, fitted with three telephones such that, though they can be moved round the counter, they do not become entangled. Each clerk on duty has within reach two of the ticket cases, which are arranged in pairs, and each case or cabinet is designed so that every ticket in its appointed rack is visible and easily accessible. This is possible as there is a series of ten sliding drawers in each cabinet, which run on castors and pull out as shown in the illustrations on page 261. Each drawer is divided into compartments to suit the sizes of tickets, motorcar checks, and berth coupons, and above the drawers are railway tickets, stationery, etc. The cases are of oak and are enclosed with roll-top type shutters when not in use; one telephone serves each pair of cases. These facilities have secured greatly increased booking office efficiency.

* * * *

Non-token Working in Victoria

Certain single line electrified sections on the Victorian Railways are being worked by the direction or control lever system combined with complete track circuit, as described in the article on page 251 in this issue. This system is similar in principle to the method in use between Coleraine and Macfin on the L.M.S.R. (Northern Counties Committee), described in THE RAILWAY GAZETTE for May 19, 1939 (p. 819), and installed earlier on the L.N.E.R. between Castleford and Ledston. In some cases on the Victorian lines the single line section is divided by intermediate signals, as in the well-known

absolute-permissive automatic signalling system, enabling more than one train at a time to travel in the same direction between two crossing loops, often a great convenience in handling traffic expeditiously. The locking arrangements are not at all complicated and complete protection is assured by the addition of train stops. The principle of dividing a single line section for following moves was, of course, adopted long ago in the train staff and ticket system, much used at one time in Great Britain, block posts being used to separate following trains travelling with tickets.

* * * *

Stresses in Permanent Way

Considering how large a sum railways expend annually upon the upkeep of permanent way, time and money spent on research and experiment likely to render increased knowledge of the forces to which track is subjected by traffic and to point to ways of minimising their effects, can be fully justified. It is surprising that more has not been done in this direction. The Railways Department of the Government of India has just published a report of three years' intensive research into this problem which throws much valuable light on the matter, and we commend the report to the attention of those who direct and are responsible for permanent way work. Faced with wide terms of reference, which include the lateral stability of track as well as the increased rail stress and deflection resulting from the passage of vehicles at speed, the investigators have reached valuable conclusions, and have established beyond doubt that higher speeds induce correspondingly greater rail stresses and deflection of the track. Except for an interruption caused by the present war there is a definite trend to higher maximum and average speeds, and the information given in the report therefore comes at an opportune moment. Faced with the responsibility of deciding whether an increase of speed may be permitted with safety upon an existing track, permanent way engineers should now be able to judge with considerable accuracy what the resultant increment of stress is likely to be, and thus to judge whether or not it may be allowed without undue detriment or danger.

* * * *

Front Ends of Streamlined Engines

The degree of efficiency attending locomotive design is dependent in large measure on the front-end arrangements, and the importance of this feature has advanced commensurately with other developments in the construction of modern high power engines in this country and abroad. The article in last week's issue of THE RAILWAY GAZETTE under the heading "The Smokebox of Streamlined Engines" dealt with this subject as affecting the well known 4-6-2 type express locomotives designed by Sir Nigel Gresley, Chief Mechanical Engineer of the L.N.E.R., and was explanatory of the details of the layout of piping and other fittings within the smokebox of the streamlined "A.4" class. To the experienced locomotive engineer the article referred to may have appeared somewhat elementary, but this journal has to cater, not only for those within that category, but also for readers who, whilst themselves well versed in other aspects of railway practice and operation, desire to keep themselves tolerably well abreast of developments in locomotive design. Chief mechanical engineers on railways are active in the investigation of anything likely to lead to the improvement of the locomotive, and one of the most potential lines of exploration is how to make the most profitable and economical use of the steam generated within it. It is worthy of mention that Sir Nigel Gresley, intent on that pursuit, has fitted some of his engines of the same class with the Kylchap double blastpipe and chimney exhaust.

Great Western Railway Company

THE full report and accounts of the Great Western Railway Company for the year 1939 confirm the view we expressed last week in commenting upon the dividend, that "but for the intervention of the war, the stockholders might have fared better." The directors state that "apart from the outbreak of the war the results would probably have approached those for the year 1937." That is to say, the net revenue which has been returned for 1939—£6,607,324—would have been nearer £6,886,500 and, on that basis, would have permitted the payment of a dividend upon the ordinary stock of $4\frac{1}{2}$ per cent. in place of the $3\frac{1}{2}$ per cent. paid, which compares with $\frac{1}{2}$ per cent. for 1938. That in itself might be considered a sufficient answer to those who voice the view that the railways are "profiteering" from the war. Dividends on the ordinary stock for the past twelve years have been as follow:—

1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
%	%	%	%	%	%	%	%	%	%	%	%
5	7 $\frac{1}{2}$	5 $\frac{1}{2}$	3	3	3	3	3	3	4	$\frac{1}{2}$	3 $\frac{1}{2}$

The returns issued this year are considerably curtailed, and, but for the statement circulated by the board with the dividend declaration, no indication would have been forthcoming as to the division of the revenues between the first 8 months of the year and the 4 months of war. The accounts show net revenue for 1939, including estimated adjustment in respect of the period of control, at £6,607,324, which goes against £5,043,753 for 1938. The balance brought forward from the previous year is £87,085 (against £151,578 a year ago when £100,000 was appropriated from Contingency Fund), giving £6,694,409 (in comparison with £5,295,331). Deducting loan and debenture interest (£1,649,855) the balance available for dividends is £5,044,554, against £3,645,483. Dividends on rent charge, guaranteed, and preference stocks absorb £3,339,914, leaving a balance available for the ordinary stock of £1,704,640, compared with £301,734 a year ago. As previously announced, this permits of the payment of a dividend of $3\frac{1}{2}$ per cent. (against $\frac{1}{2}$ per cent. for 1938), and leaves a balance carried forward of £202,099. Results for the past three years are summarised in the following table:—

	1937	1938	1939
	£	£	£
Total expenditure on capital account	185,390,751	186,363,713	187,377,822
"J" joint lines—company's proportion of net revenue ..	145,949	144,318	147,083
Miscellaneous receipts (net)* ..	1,090,562	1,085,543	*271,235
Net revenue	6,886,505	5,043,753	6,607,324
Interest on loans and debentures	1,649,832	1,649,848	1,649,855
Dividends on rent charge, guaranteed, and preference stocks	3,344,699	3,343,749	3,339,914
Balance after payment of preference dividends	1,791,974	50,156	1,617,555
Dividend on ordinary stock ..	1,717,189	214,649	1,502,541
Rate per cent.	4	$\frac{1}{2}$	3 $\frac{1}{2}$
Surplus or deficit (+ or -) ..	+ 74,785	- 164,493	+ 115,014
Appropriation from contingency fund	†	100,000	—
Balance brought forward from previous year	76,793	151,578	87,085
Balance carried forward to subsequent year	151,578	87,085	202,099

* Other than those included in financial arrangements with Government

† £100,000 appropriated to contingency account for new works

Details of revenue receipts and expenditure of the whole undertaking (account No. 8), are considerably curtailed by reason of a number of the items being included in the financial arrangements with the Government. It is shown that the company's proportion of net revenue of jointly owned and jointly leased lines is £147,083 which compares with £144,318 and that its revenue from interest

and dividends from investments in road transport undertakings and the Penarth Pontoon, Slipway & Ship Repairing Co. Ltd. is £271,235, an increase of £22,921. This source of income is of interest since it is specifically excluded from the pool of receipts with the other companies under the arrangement with the State.

The directors report that work on the scheme for the provision of electrified lines from North Acton to Ruislip is proceeding satisfactorily. In present circumstances the work from Greenford eastwards will be completed in a modified form, and beyond that point will be limited to the laying of a single track to the new car shed at Ruislip, which is approaching completion. Good progress has also been made with various schemes undertaken under the Railways (Agreement) Act, 1935. The Minister of Transport has been asked to agree that certain schemes already begun, including the reconstruction of the stations at Plymouth (North Road), Penzance, and Weymouth, shall be deferred. Numerous works throughout the system have been, and are being, carried out by the company for and at the expense of Government departments.

* * * *

Northern Counties Committee (L.M.S.R.)

MORE than usual interest attaches to the financial accounts and statistical returns for 1939 of the Northern Counties Committee of the L.M.S.R. This is the only section of any British railway company which is continuing to issue traffic returns during the war, and, further, the revenue which the L.M.S.R. derives from this line is specifically excluded from the pool established under the recently-concluded financial agreement between the Government on the one hand and the railway companies and the London Passenger Transport Board on the other. The following table gives the main financial statistics:—

	1937	1938	1939
Capital expenditure	£ 3,750,044	£ 3,779,004	£ 3,784,411
Gross receipts from businesses ..	669,338	450,453	480,430
Revenue expenditure on ditto ..	478,049	462,451	466,963
Net receipts of ditto	Dr. 8,711	Dr. 11,998	13,467
Miscellaneous receipts, net	12,327	8,513	19,511
Total net income	3,616	Dr. 3,485	32,978
Interest, rentals, etc.	1,242	1,241	1,241
A.R.P. expenditure	—	—	1,400
Appropriated for interest on capital	2,374	—	30,337

The accounts in themselves are noteworthy on this occasion for the striking recovery which is shown in the net income of the committee. Just as in the previous year, the failure of interest on Northern Ireland Road Transport Board stocks was the main factor in the loss of £4,726 recorded for 1938, so in the year under review the fact that £9,953 from the Northern Ireland Board "A" stock, for the period January, 1938, to June, 1939, is brought into the accounts plays a substantial part in the profit of £30,337 which is now recorded. But at the same time there has been a marked improvement in railway operations; gross receipts were £412,207 in 1939 against only £376,526 in the previous year, and expenditure was £404,573 against £395,827. The result is that net receipts from this source in the latest accounts show a credit of £7,634 whereas in 1938 there was a debit of £19,301. On the other hand, net receipts from hotels, etc., were lower at £5,833 against £7,303. The total net receipts at £13,467 therefore went against a debit of £11,998 for the previous year. Miscellaneous receipts (net) were £8,513 higher at £19,511. A new item ranking in the appropriation of net income is the apportionment for the year of A.R.P. expenditure, which figures at £1,400. Passenger train receipts at £246,072 were greater by £13,130, of which ordinary passenger fares accounted for

£6,609; total goods train receipts at £160,969 were higher by £23,004. Total traffic expenditure increased to £401,790 from £393,088, and total railway expenditure to £404,573 from £395,827.

* * * *

Great Northern Railway Company (Ireland)

TOTAL gross railway receipts in the year 1939 increased by £120,047 and all the main sections of traffic contributed to the improvement. Among passenger train traffic there was a gain in ordinary passenger takings of £5,988 at £402,782, although there was a small decline in receipts from second class passengers. Season tickets yielded £52,488 or £5,549 more than in the previous year, and workmen's tickets at £6,959 were higher by £1,749; in all, receipts from passengers were greater by £13,286 at £462,229. Parcels and excess luggage brought in £70,180, and, after allowing for expenses of collection and delivery, total passenger train receipts at £586,626 registered an advance of £15,749. Goods train traffic also improved substantially; at £585,260 it showed a rise of £99,060 to which merchandise, less expenses of collection and delivery, contributed £84,592 with a total revenue of £443,369. Livestock at £80,392 was better by £6,828 and fuel movement at £41,951 was up £5,269; other mineral traffic was £19,548, higher by £2,272. Total traffic receipts at £1,171,887 were therefore higher £124,810; after allowing for mileage, demurrage, and wagon hire (balance), joint lines and miscellaneous receipts, total receipts from railway working were £1,221,376 as compared with £1,101,329. Expenditure was higher by £35,176 leaving net receipts of £104,406 greater by £74,871. Road transport yielded gross receipts of £150,589 or £5,045 less, but an economy of £6,343 was made in expenditure at £139,607 so that net receipts at £10,982 were better by £1,288. Hotel and refreshment rooms showed net receipts lower by £202 at £2,780. The accompanying table gives the general financial position for the past three years:—

	1937	1938	1939
Total expenditure on capital account	£ 10,052,929	£ 10,052,929	£ 10,052,929
Gross receipts from businesses ..	1,320,073	1,311,038	1,424,655
Revenue expenditure on ditto ..	1,214,308	1,269,231	1,306,486
Net receipts of ditto	105,765	41,807	118,169
Miscellaneous receipts (net)	33,725	28,811	30,758
Total net income	139,490	70,618	148,927
Interest, rentals, and other fixed charges	115,229	131,188	141,352
Dividend on guaranteed stock ..	34,771	—	—
Balance	Dr. 10,510	Dr. 60,570	7,575
Appropriation from general reserve	—	25,000	—
Balances released from miscellaneous accounts	9,062	1,301	—
Brought forward	1,448	—	Dr. 34,269
Carried forward	—	Dr. 34,269	Dr. 26,694

Mileage run by the company's steam locomotives has increased from 4,419,531 to 4,497,316, but by diesel railcars it has fallen from 393,011 to 379,391 and by diesel railbuses from 58,563 to 40,907. Locomotive running expenses are up from £258,119 to £263,814, and traffic expenses have risen from £301,313 to £303,801. The directors point out that decisions are still awaited from the Governments of Eire and of Northern Ireland on the future of public transport. Now that conditions arising out of the emergency necessitate increased reliance on services to be provided by the company, it is no less a matter of urgent importance that such decisions should be taken if the company is to continue to render those services with due stability and efficiency.

Great Southern Railways Company

GROSS receipts for the year 1939 show an increase of £195,876 at £4,475,664 as compared with the previous year; expenditure is only £120,521 higher at £4,085,163, so that net receipts are greater by £75,355 at £390,501. Net miscellaneous receipts from rents, interest, etc., rose by £1,220 to £37,187, giving a total net income of £76,575 in advance of that for 1938 at £427,688. Debenture interest takes £308,595 and interest, rentals, and other fixed charges absorb £82,033, leaving a balance of £37,060 which is carried forward. For 1938 there was a debit balance, after meeting fixed charges of £6,101 which was met by a transfer from compensation under Irish Railways (Settlement of Claims) Act, 1921. The directors are compelled to defer payment of a dividend on the guaranteed preference stock and also arrears for the year 1938. The company's appeal against the valuation of railway hereditaments has been decided in the company's favour and the company is now in a position to proceed to recover any sums due as a result of the judgment of the courts. When this asset becomes available and the financial position of the company justifies such a course it is the intention of the directors to meet the payments due on the guaranteed preference stock.

Total railway receipts in 1939 were £3,349,288, a rise of £183,160 in comparison with 1938, and railway working expenditure was up £79,993 at £2,996,160, giving an improvement of net receipts of £103,167 at £353,128. Total receipts from passengers were £819,912, a fall of £24,573; first class (£53,979) were down £4,325 and third class (£765,933) were less by £20,248. Parcels and mails (£455,465) brought in £13,178 more. In the merchandise traffic of £1,439,527 there was an improvement of £159,379, and smaller increases in livestock and in fuel, partly offset by some loss in other mineral traffic, left goods train receipts £193,040 better at £2,049,840. Among the ancillary businesses, which yielded £37,372 or £27,813 less, road transport net receipts fell by £21,089 at £39,673. The ratio of railway traffic expenditure to railway traffic receipts was 89.66 per cent. in 1939 against 92.41 per cent. in 1938. In operating expenses there was an advance of £11,819 under locomotive running, but traffic expenses were lower by £1,202. The amount charged to rolling stock maintenance was greater by £38,889. There are returned 8 Drumm battery vehicles with a total seating capacity of 538, which compares with 4 vehicles seating 258 seats in 1938. Total engine mileage for 1939 is given as 12,027,824 as compared with 11,994,255 in the previous year.

	1937	1938	1939
Total expenditure on capital account ..	£ 31,054,309	£ 31,119,145	£ 31,175,862
Gross receipts from businesses ..	4,329,326	4,279,788	4,475,664
Revenue expenditure on ditto ..	3,924,660	3,964,642	4,085,164
Net receipts of ditto ..	404,666	315,146	390,500
Miscellaneous receipts ..	41,685	35,967	37,187
Total net income ..	446,351	351,113	427,687
Interest, rentals, and other fixed charges ..	366,321	394,124	390,627
Dividend on guaranteed preference stock ..	77,727	Nil	Nil
Surplus or deficit (+ or -) ..	+ 2,303	- 43,011	+ 37,060
Proportion of compensation under Irish Railways (Settlement of Claims) Act, 1921 ..	—	6,101	—
Brought forward ..	34,607	36,910	—
Carried forward ..	36,910	—	37,060

The latest developments in the company's and the Great Northern's appeal against valuations fixed on their property in Eire are the subject of editorial comment on page 241.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents.)

Bakerloo Line Indicators

Harrow, February 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—In connection with the special indicator mentioned in your issue of February 16, at page 209, for the Stanmore trains on the Bakerloo Line, is there any technical reason for the change in the lighted indicators on the Bakerloo trains? These used to carry the destination "Harrow," "Watford," or "Queens Park" in large letters. Now they have been replaced by two-line boards with the word (surely redundant) "Bakerloo," crowded in, making the destination name so small as to be hardly legible at any prudent distance.

Yours faithfully,

GEORGE L. BOAG

[We understand that the indicators referred to by Mr. Boag are the board's standard type which, as he says, show the line, as well as the destination. They were placed on Bakerloo trains some years ago. During the blackout it is not permitted to illuminate the indicators outside the tunnels sections and this may account for Mr. Boag's complaint.—Ed. R.G.]

Flaws in the London Transport

Railway Training Centre,

R.E. Mess, Longmoor

February 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—May I claim space in your columns to draw your attention to the unsatisfactory state of London Transport. When the L.P.T.B. was formed many people fully imagined that the whole of London suburban railways would be co-ordinated into one scheme. If the L.P.T.B. were not to operate all the trains it was expected that the board would at least plan the timetables of all London suburban trains, and publish a map and timetable of London and generally direct and control suburban transport. Apart, however, from the taking over and electrifying certain L.N.E.R. suburban lines nothing has been done. In general it can be said that the L.P.T.B., for reasons perhaps of better financial position, are able to run cleaner and brighter trains, to build brighter stations, and to undertake greater schemes of improvement than are the main companies. It is only necessary to compare underground stations with for instance West London line stations such as Kensington, Addison Road, to see the truth of the statement.

Coming to the actual question of traffic operation in London, it is sometimes quicker to travel by tube, sometimes by Metropolitan or District, and sometimes by main line. South of the Thames the Southern has completed a suburban electrification, which is almost self contained, in fact makes only three main contacts with the L.P.T.B. North of the Thames there is a tremendous confusion of L.N.E.R., L.M.S.R., G.W.R. and L.P.T.B. lines. Without carrying a portfolio of timetables and maps, it is impossible to see at a glance one's quickest route. An example, for instance, is Richmond to Hampstead, where the L.M.S.R. give a direct connection and the L.P.T.B. via District and Northern Line is longer and slower. The average traveller when consulting his tube map would be unaware of the existence of the L.M.S.R. line. The L.M.S.R. to Earl's Court is shown on the latest L.P.T.B. maps, but, as an example of lack of co-ordination, there is no timetable or indication of the running of the trains to be found on the whole of Earl's Court station.

May I suggest that the L.M.S.R. Richmond—Broad Street line, and other L.M.S.R. electric services, should be organised into a Northern Outer Circle; that the stations should be modernised to L.P.T.B. standards; and that, where stations are in close proximity to L.P.T.B. stations, escalators and subways should be provided. The West London and West London Extension would benefit from L.P.T.B. control and there is no reason at all for the present infrequent steam service from Kensington to Clapham. A frequent through service from Clapham Junction to Willesden Junction is required. In East London obviously the Shoreditch line

should connect with L.N.E.R. suburban services. The line simply shouts that it was intended to connect the Great Eastern section with the Southern. Another service required is from New Cross to Clapham Junction. If then the L.P.T.B. provided a connection from Shoreditch, L.N.E.R., to Shoreditch, L.P.T.B., you would then have an outer circle. Differences of electrical system would prevent through running all the way round, but it would be possible to run from Clapham Junction over the West London through Willesden over the L.M.S.R. and on to the East London as far as New Cross, and the Southern could operate in connection. A journey from Uxbridge Road to Denmark Hill, or from London Fields to Peckham Rye would cease to be a nightmare. Admittedly the new connection from Stratford to Mile End of the Central London line will link L.N.E.R. lines east of Stratford by changing at Whitechapel with the Southern, but that is only part of a piecemeal scheme. All London suburban railways need to be conveniently runned. I trust that no one will write and blame the war, as there was no evidence that these problems were to be tackled before the war, and, though perhaps they cannot be tackled now, they should be tackled after the war.

It is idle to talk of expense, etc. Many poorer countries than England have tackled bigger schemes and the much maligned German railways had their Stadtbahn, their Ringbahn, and were building a Nord-Sudbahn. Travel in Berlin, due to one organisation running all suburban railways, is vastly simpler than in London. In fact in Berlin an efficient suburban electrification has rendered an underground railway almost unnecessary. The underground carries little traffic compared with the Stadtbahn. The fact is that private railway companies have produced intolerable muddles. In London, at any rate, there should be only one railway organisation, and without doubt in due course the four groups will have to amalgamate whether they remain private, semi-public, or State-owned.

Yours faithfully,

W. B. LAWRENCE

Periodical Weighing of Locomotives

C/o Traffic Department, Leopoldina Railway,
Rio de Janeiro

January 7

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—The contribution under the above heading in your September 15 issue made a strong case for the more frequent weighing of locomotives. Admirable as was the article, it is a pity that the limelight of propaganda was directed mainly upon first class lines where high-speed running is a normal feature and consequently the use of weighing apparatus normal practice.

But is there a case in respect of the many smaller lines which possess no weighing equipment whatsoever? Whilst the writer feels that there is, a comprehensive type of propaganda that would contemplate colonial railways is entirely lacking. Although none of the lines concerned would deny that there are other effective means of calculating unequal weight distribution, there are so many considerations militating against their adoption, prominent amongst which is the difficulty of correcting differences once they are known.

The correction obviously depends upon two distinct factors, and would be done in two stages, *viz.* (a) equalisation of springs, and (b) adjustment of hangers. For the first a machine is necessary to test each spring for deflection and camber after delivery by the spring-smith. The second, and the more serious difficulty, can be done satisfactorily only if adjustable spring hangers are fitted; with rigid hangers (many South American engines were, like Johnny Walker, born in 1880) the only available method would be to lengthen or shorten them by forging, a laborious and most unreliable method, or else to carry a large number of ready-made spares in stock, which would be expensive and make for confusion and complication.

Then again, the advent of motor-coaches and diesel units has made it possible, on a number of lines, to restrict the use of such engines that were known to be "heavy" on the track or on the weaker bridges. Now that the engines with heavy

axle loads have been filed away, or are run only on the main line, there is no call nor encouragement in these bad times for new capital expenditure. It is argued that weight differences can be kept within textbook standards without recourse to mechanical appliances, that damage to the track is negligible, or exaggerated, and that in any case, in the hands of third-rate workmen, the remedy would be worse than the disease.

Be that as it may. A reconsideration is warranted on the following grounds. The enhanced cost of imported stores brought about by the depreciation of local, in terms of foreign currency, for some years, has necessitated severe retrenchment in track maintenance. This means that whilst the running order remains unaffected, far more time is spent on ballasting the strength is much less and thereby more vulnerable to the damaging effect of hammer-blow—be it controlled or no.

For example, to recall a test made on a line (not in Brazil) where sleeper renewals had been greatly restricted, it was proved that a certain engine (14-ton drivers) known to be badly balanced broke 80 sleepers per run along a short branch line of 57 km. The line (65-lb. rail, 1,200 mixed sleepers per km., earth ballast) had steadily deteriorated in condition until there were roughly 25 per cent. "bad" sleepers (broken at least once or incapable of holding a spike) and a higher percentage still of "fair" sleepers (estimated lease of life maximum 2 years).

Now if that track had been in better condition, say with only 10 per cent. "bad" sleepers, would anyone maintain that the same number of sleepers, or even one quarter of that number, would have broken? I think not; and this seems to open a new field of research, for the track of most of the South American railways has deteriorated in recent years, although whether the ratio of breakage-increase is calculable under working conditions is another matter.

But, on the other hand, if the weight distribution of that engine had been corrected so as to be favourable as regards sleeper load and ballast quality, the reverse would have happened in regard to rail stress, and probably with catastrophic results having regard to the expense and difficulty of importing rails. The desirable, and probably the cheaper, solution—for exchange depreciation has come to stay—would seem to lie in the purchase of vehicles with a lighter axle load, in which the prime mover is a rotary one, as in diesel units, or else in acquiring more economical engines with reduced dynamic augment.

Then again, the adoption of wheel balances would necessitate a revision of the original drawings of the locomotives, since many show an equal weight upon each driver, thus not allowing for rail deflection. This is at a maximum at the passing of the axle nearest to the centre of gravity of the engine as a whole. In the case of a 2-6-0 engine, the centre of gravity would be close to the middle driver, which should receive a greater load than the leading driver, this in turn receiving slightly more than the trailing driver. In this way, the spring-borne weights would be levelled up by the wave of rail deflection set up by the engine in motion. Unless this were done, there would be a loss of tractive effort and an increase in hammer-blow.

Apart from the question of fore and aft distribution, how can correction be made when the totals for the two sides differ from one another? In the example of a badly-balanced engine cited in the original article, the left side is carrying 1t. 8c. 1q. more than the right, and it is not clear how spring or hanger adjustment, within the limits imposed by practice, could correct the condition.

Badly-balanced engines, it is considered, if not the major cause of many accidents put down to other reasons, are certainly the cause of many trains not keeping to schedule. It was pleasing to see some recognition of the first in the inquiry-report of the first fatal accident in Jamaica (*vide* your July 21 issue). The second will bring down a shower of opprobrium, intermingled with loud cheers from traffic colleagues. But let us imagine an engine where the total load on three driving axles is divided thus:—

	Per cent.	Per cent.	Per cent.
Say	33.3	27.0	39.7
Instead of say	33.3	33.3	33.3

Such a distribution indicates that when the maximum tractive effort of the engine is called for, as when starting or

when climbing a steep bank, the middle drivers would tend to slip at only $\frac{27 \cdot 0}{33 \cdot 3}$, or 81·1 per cent., of the tractive effort which could be exerted if the weight distribution were normal. How many times have cases of unpunctuality been so conveniently booked to "bad coal," when in reality the steaming power of the engine was unaffected!

To emphasise this argument. Let us imagine a six-wheel coupled engine with one pair of wheels blocked up and thereby relieved of all load. The total adhesion weight remains the same, no matter the distribution, and the theoretical tractive force also; but would that engine haul the same load up a steep gradient as it would do in normal circumstances? It is a *reductio ad absurdum* argument, but nevertheless, the logical conclusion, that must be accepted, is that, just as large weight variations exist necessarily when engines are not weighed, so must the tendency to slip be increased—as distinct from the destructive force of hammer-blow on down grades.

The writer has endeavoured to show that there are many facets to the subject, many of which have been ignored and others which have been glossed over lightly. In conclusion, the

opinions expressed are submitted with diffidence, though they are felt to be correct in general principle.

Yours, etc.,

T. P. ROGERS

An Old "Parliamentary" Ticket

London, February 19

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have in my possession an old railway ticket, numbered 177, bearing the inscription "Parly Train DOVER To TE WELLS, Third Class." On the reverse is part of a red wafer seal embossed "Dover Co.....Landing Pier." The ticket is dated "8 Dec. 1." Parliamentary trains were operated between 1844 and 1883 but the old South Eastern registers have been destroyed and the year of issue cannot be stated. Can any of your readers furnish any information concerning the probable year of issue?

Yours faithfully,

A. B.

PUBLICATIONS RECEIVED

John Brunton's Book: 1812-1899.—Cambridge: The University Press; London: Cambridge University Press, 200, Euston Road, N.W.1. 8 in. x 5 in. 164 pp. Price 7s. 6d. net.—The great nineteenth-century era of British engineering has become inseparably associated with a few eminent names, such as the Stephensons, the Brunels, Trevithick, and Vignoles, mainly as the result of the efforts of their biographers. Dr. Samuel Smiles may be credited with having infused "human interest" into a somewhat heartless and impersonal age by writing his famous "Lives of the Engineers," but one result has been the glorification of a few outstanding individuals (at any rate in the popular mind) at the expense of the vast army of competent civil engineers who formed the backbone of this period. The lives and doings of such men fill many gaps in the outline story provided by the works of their better-known leaders, but unfortunately it is all too rare for such lives to form the subject of a printed volume.

We therefore extend a specially cordial welcome to "John Brunton's Book" which has the added merit of being a first-hand narrative, by an engineer who contributed not a little to the whole of the Victorian period, written exclusively with the object of interesting his grandchildren. As such, it lacks precision in some places and contains comparatively little engineering detail, but it is a lively story and impresses the reader with its essential accuracy, as indeed is to be expected from a man whose memory enabled him to record vivid details of the celebration of the victory at Waterloo, which took place when he was but three years old.

Brunton was the son of an engineer, and chance enabled him to serve his time at Hayle alongside Frank Trevithick (the son of the famous Cornish pioneer) who himself became Locomotive Superintendent at Crewe and was in effect the father of Crewe works.

Brunton's first responsible task was to act as resident engineer for the construction of a tramroad linking the Swansea Valley with Brecon Forest, and his experience on this work provided an interesting commentary on the primitive life in parts of Wales at that period. Brunton then became one of George and Robert Stephenson's assistants on the London & Birmingham Railway and afterwards on the Manchester & Leeds Railway. He worked on the Maryport & Carlisle line and subsequently carried out railway construction in Wiltshire, Somerset, Dorset, and Devon. During the Crimean War he played an outstanding part as an engineer in the provision of hospital and other amenities, and afterwards was responsible for a large amount of railway construction in India. From 1870 onwards he practised for twenty years as a consulting engineer and paid particular attention to mineral railways and street tramways. The last few years of his life was spent in retirement, and he died in April, 1899, at the age of 86. His life story provides an interesting and valuable link between the days of the pioneers—most of whom he knew and many of whom he served—and the dawn of the twentieth century.

The Vacuum Brake, Its Theory, History, and Practice, as used on the Great Western Railway.

By C. H. Mathers, Shrewsbury: Wilding & Son Ltd., 33, Castle Street. 6½ in. x 4½ in. 78 pp., illustrated. Limp cloth covers. Price 1s. 6d. net.—We were informed by the author some time during 1938 of his intention to prepare a small work dealing with the theory and practice of the vacuum brake as used on the G.W.R., and being, as we then stated, convinced of the utility and need of such a publication, we welcome its appearance, now it has been completed. Although quite a substantial amount of literature is available concerning the principles on which the vacuum brake operates, accompanied by particulars and

illustrations of the details of its construction, it remained for someone to supplement the existing matter by a treatise on the apparatus as applied to G.W.R. locomotives and rolling stock, and Mr. Mathers has done this in a practical and very convenient form. The text is explicit and well arranged; only simple language is used and yet everything has been done to make clear to the reader all that he can wish to know about the subject. The author has had a long experience as instructor and lecturer to an important railway mutual improvement class and as a practical locomotive man in the service of the Great Western Railway.

Aircraft Machine Tools.—Not unnaturally, the well-known machine-tool maker, Wm. Asquith Limited, of Halifax, has concentrated attention recently on the production of high-class tools for the machining of aircraft and aero engine constituents. Full and illustrated particulars of these are given in Asquith's list No. R.75, of which there are two editions, one for home distribution and one for circulation overseas.

Aluminium Technique.—The January issue of this monthly publication of the Aluminium Union Limited, Adelphi, London, W.C.2 is made up of two articles: first, aluminium-alloy gravity die-casting, and secondly, the sawing and filing of aluminium. The second article contains detailed particulars of rotary files, cutting discs and other devices for the sawing and filing of aluminium and magnesium alloys.

Machine Tool Bearings.—The application of roller bearings to machine tools is increasing rapidly. Considerable attention has been given to this field by British Timken Limited, and a wide variety of uses for the taper roller bearing in machine shop practice is illustrated and described in catalogue No. 384, issued from the Aston works. Some of the machine tools equipped with this form of bearing are centreless grinders, locomotive axle journal re-grinders, high-speed automatic bar machines, tube and shaft borers, turret lathes, buffing and polishing spindles, and woodworking machinery.

THE SCRAP HEAP

Charny, in Quebec, is a real railroad community; the mayor, Mr. A. Arcand, now serving his fourth term, is a Canadian National Railways pensioner, while all members of the council are Canadian National employees. Seven departments of the railway are represented in the town government.

THE NAZI PARTY COSTS £385,000 A DAY

The upkeep of the Nazi party organisation costs the German people about £140,000,000 a year (approximately £385,000 a day), according to the *Petit Parisien*, which states that the figures were taken from the party's annual financial statement signed by Herr Schwartz, the Treasurer, and Dr. Ley, the Labour Front Leader.

REBUFF FOR THE FRESH AIR FIEND

The cold wave and the necessity for economising in fuel has evidently made the fresh air fiend a particularly unpopular fellow in Germany just now, according to a Reuters message from Amsterdam. "Don't leave the window or door open; it makes the carriage cold," is the injunction given to railway travellers by the *Westfälische Landeszeitung*, which adds: "We owe it to our fellow passengers to avoid such inconsiderate acts which have already given many of them bad colds. The Reichsbahn will also be grateful, for heating means much steam and steam means coal."

The accompanying illustration, for which we are indebted to the *G.W.R. Magazine*, shows an interesting weather-vane which surmounts the Town station, Birkenhead. Originally this station was the terminus of the Chester & Birkenhead Railway, which was incorporated on July 12, 1837, and opened on September 22, 1840, from Chester (Holyhead junction with the London &

North Western Railway) to Birkenhead (Grange Lane). The vane is of the type of locomotive that brought the first trains into Birkenhead, and it is probable that its manufacture dates back nearly a hundred years. By an Act of Parliament of July 22, 1847, the Chester & Birkenhead Railway was vested in the Birkenhead, Lancashire & Cheshire Junction Railway. Later these lines were absorbed by the Birkenhead Railway (now G.W. & L.M.S. Joint). The 65-chain extension from Grange Lane to Woodside Ferry (the present Birkenhead terminus) was not authorised until July 31, 1871, and Birkenhead (Woodside) station was opened on April 1, 1878.

A FAMILY RECORD

For more than 100 years there have been railwaymen in the family of Mrs. Frances Lowther, of Backhouse Street East, Darlington. Mrs. Lowther's grandfather started the ball rolling in 1825 when he helped lay the lines of the Stockton & Darlington. At the present time Mrs. Lowther has five sons on railway service. Her husband, who died some years ago, was a guard. And although she's seventy and a grandmother, Mrs. Lowther means to do her share toward keeping up the family tradition. She is President of the Darlington No. 1 branch of the National Union of Railwaywomen's Guild (the oldest branch in the North-East), and has held every office in the guild except that of Secretary. She is also a member of the local N.U.R. Orphan Fund Committee and other women's guilds. And as if that isn't enough she's knitting for the troops. "Work keeps you young," she says.—From *"The Daily Mirror."*

Hitler travels in style. When he visited the Polish front and, more recently, the Siegfried Line he went in a special train whose fittings are described by a Nazi fan as being "like fairyland." The old German royal trains were comfortable enough, and remained in use for some years after the war; in 1930, for instance, Stresemann was using a special coach which had been reserved for the Crown Princess. But they had none of the modern luxuries of Hitler's train. When the Kaiser travelled, a captain had charge of the arrangements. A general has to look after Hitler; his name is Rommel, he has no other duties.

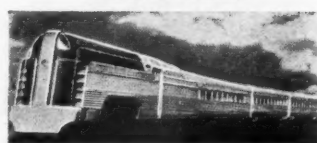
Hitler's own compartment, as a precaution, is sometimes in the front, sometimes at the back of the train. In the next compartment travel Storm-troop Leader Brückner and Black-guard Leader Schaub—a tough bodyguard. Next to them travels Ordnance-Officer Wünsche—a "new boy," for his predecessor Bahls died (possibly bumped off) in Poland. On the other side of Hitler's compartment travel his private military



GRANDFATHER



FATHER



AND SON!

**Three generations of service
to America's railroads!**

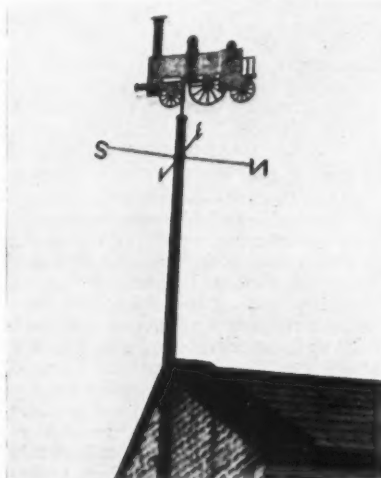
The above advertisement of the Graybar Electric Company, which recently appeared in our American contemporary the "Railway Age" cleverly turns 70 years of service to American railways into a family record

staff—Colonel Schmundt, Captains Engel, and von Below; then Press Attaché Dietrich. Cameraman Heinrich Hoffmann has a compartment to himself. His monopoly of news-pictures brought him recently the resounding title of Reichsbildberichterstatler.

Two women secretaries, Christa Schröder and Wanda Dararowsky, travel in an end compartment of the train, are sent for whenever Hitler wants to have a conversation on record. Two pressmen, a pilot, a few generals make up the rest of the gang. One of the generals who are usually on the train, Bodenschatz, wasn't there when Hitler went to the Siegfried Line; he is supposed to be too friendly with Göring.—From the *"Daily Express."*

LEGAL FIGHTING FOR SEATS

Conditions on the New York's underground railways during the rush hours are so bad that they provide a legal excuse for fighting your neighbour. This, in effect, was the ruling of Magistrate Michael A. Ford in a disorderly conduct case in Harlem the other day. A man and two women had been charged with starting a fight over a seat in the underground, and there was stated to be clawing and even biting. But Magistrate Ford said: "I don't think that a biting and scratching match indulged in by respectable citizens, and caused by the jolting of a crowded subway train during rush hours constitutes disorderly conduct." He dismissed the charges.



Locomotive weather vane at Birkenhead Town station

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

NEW ZEALAND

North Island Main Trunk Improvements

Among the various works which are being carried out to improve operation over the main trunk line, is the subdivision of the difficult nine-mile single line section—seven miles of which are at a continuously rising gradient of 1 in 70—between Te Kuiti and Puketutu stations, in the King Country, by the construction of an intermediate crossing loop at Waiteti. Automatic signalling has also been extended from Te Kuiti to Puketutu, and the points and signals at Waiteti are automatically controlled from Te Kuiti—four miles away—under the new centralised traffic control system. The new loop has standing room for 100 four-wheeled wagons, and there is also a dead-end siding holding 15 wagons.

To further facilitate main trunk and other working, an automatic telephone exchange was recently opened at Frankton junction. It serves 80 automatic and 20 district lines, giving a most efficient service between Frankton and all other North Island stations.

Signalling Developments

As proof of the Railway Department's signalling activities it is noteworthy that the total expenditure of the Signal and Electrical Branch for the year ended March 31, 1939, was £186,546, and it is anticipated that the current year's outlay will amount to £230,000. A number of stations in both islands have been interlocked, loop signals provided, and the main line crossing loops have been fitted with mechanisms for motor operation. On the West Coast, the track-circuiting of Greymouth yard, which will further ensure the safe working of trains, is well advanced. The department is thus keeping pace with the most advanced practice in railway signalling and operation in other countries.

Repairs and Renewals of Bridges

The work of building new bridges and renewing and strengthening existing ones is being pursued steadily throughout the Dominion. The 5,720-ft.-long bridge over the Rakaia River was opened for regular traffic on December 11, and the demolition of the old bridge is in hand. Trains are able to travel at 50 m.p.h. over the new bridge compared with a 20 m.p.h. restriction on the bridge it replaces. Work is proceeding on the building of the Wairau river bridge (2,295 ft. in length) near Parnassus, on the South Island main trunk line, and the 960-ft. bridge over the Wairau river, near Blenheim, is well advanced. Authority has also been given for the renewal of the Selwyn river bridge between

Selwyn and Norwood. New Zealand is very rich in rivers, and the strengthening and renewal of existing bridges is an all-the-year-round work necessitated in the interests of public safety and of efficiency. The departmental estimates provide for an expenditure this year of £140,000 for the overhaul and reconditioning of bridges in both islands.

Output of Rolling Stock—Addington Shops

The railway workshops at Addington are concentrating on the production of rolling stock to cope with the additional goods and passenger traffic anticipated during the summer and autumn. Thirteen 56-ft. second class main-line cars have been delivered from these shops during recent weeks, and nine others are under construction for delivery early; seven 56-ft. first class coupe cars are also in an advanced stage of construction. There has been considerable activity in wagon building. Since April 1, the Addington shops have delivered 400 "La" goods wagons, 10 "Ug" bogie horse boxes, and 12 "W" insulated wagons. Work in hand for early delivery comprises 250 goods wagons, 66 sheep trucks, and 34 wagons for other classes of traffic.

In a few weeks the two new "Ed" class electric locomotives for use on the Arthur's Pass Otira tunnel route will be completed at these shops. The new power sub-station now being erected at Otira will not, however, be ready for use until about April next, by which time it is expected that all the new apparatus (which is now in the Dominion) will be installed. The sub-station will then be joined up with the Lake Coleridge electrical power network, when it will be possible fully to employ the new locomotives on the tunnel route.

INDIA

Level Crossing Accident

Three persons were killed and one seriously injured as a result of a collision between a down goods train approaching Bharatkhal on Tistamuk Ghat—on the Bonarpara-Tistamuk Ghat section of the Eastern Bengal Railway—and a loaded motorbus on a level crossing. The bus, which was completely wrecked, contained 16 passengers of whom seven others, including the driver, received minor injuries.

Mysore Railways

Details are now available of the working of the Mysore Railways for the year 1938-39, the first complete year in which the entire metre-gauge system owned by the Mysore Durbar came under the operation of the Mysore State Railway Department. With a total mileage of

748·19, involving a capital outlay of Rs. 666·09 lakhs, that department began well with a fine record of efficient management and satisfactory progress during the year. The total gross earnings amounted to Rs. 78·31 lakhs, against Rs. 72·12 in the previous year. The increase of Rs. 6·19 lakhs was due mainly to larger movement of goods, though there was also a small improvement in coaching traffic.

Sanction was accorded during the year to the extension of the metre gauge line from Sagara to Talaguppe, a distance of about 10 miles, and satisfactory progress was made in the work of construction. This railway will bring the Jog falls within 10 miles of the railhead and will greatly facilitate the movement of materials in connection with the proposed hydro-electric scheme.

Through road van services between the Mysore Railways and the Madras & Southern Mahratta Railway were introduced during the year resulting in faster movement of traffic in consequence of the substantial elimination of handling of road goods at junction stations.

Jamnagar & Dwarka Railway

According to the administration report of the Jamnagar & Dwarka Railway for the year 1938-39, the development of railway communications in the State of Nawanagar has made satisfactory progress. The total railway mileage of 170·85 miles at the close of the year represents 25·3 miles per 1,000 sq. miles of territory, as compared with 23·8 miles in the whole of India. For every 10,000 of population, the Nawanagar State possesses 3·2 miles of railway against 1·22 in India.

During the year two new lines, Jamnagar-Rozi (5·75 miles) and Khambhaliya-Salaya (7·75 miles), were opened for traffic. The Maharaja Jam Sahib Bahadur takes a personal interest in the development of communications in the State, and has sanctioned a planned programme of new railway construction with a view to the development of the resources of the State, and facility for the marketing of agricultural produce.

The establishment of the Burma-Shell oil installations at Okha is expected to bring substantial new traffic to the railway and 72 oil tank wagons have been ordered in order to handle this traffic efficiently. The Nawanagar State bus service, functioning under railway control has had a successful working year during which the total earnings amounted to Rs. 2·09 lakhs. The Jamnagar & Dwarka Railway is worked under agreement with the Baroda State Railways.

Travel Habit in Students

It is encouraging to note a growing appreciation of the value of travel as complementary to the education of students in schools and colleges. Much credit for this movement is due to the railways which have actively sponsored educational tours and helped in various ways to make them attractive. Out of nearly 600 educational institutions in the territory served by the South Indian

Railway, only about 25 institutions organised excursions for students during the year 1937, but in 1939 more than 100 institutions took their boys for long and short distance tours, and there are now many such excursions actually touring the country in South India. Each party has the advantage of the use of a reserved carriage and the young tourists are very well looked after by the railway administration. Satisfactory catering arrangements are made for the full duration of each excursion. Some 500 boys and teachers of the Madras Hindu Theological High School recently concluded an interesting seven-days' excursion, visiting Madura, Rameswaram, Dhanushkodi, and other places of attraction in South India.

ARGENTINA

Buenos Aires Passenger Transport Statistics

According to figures issued by the Statistical Department of the Buenos Aires Municipality, the number of passengers transported within the city during the year 1938, exclusive of those carried by the railways, was 1,233,200,000, classified as shown in the following table:—

		Percentage
Tramways ..	384,300,000	31.16
Buses ..	396,800,000	32.19
Micro-buses ..	346,500,000	28.09
Underground lines	105,600,000	8.56
Total ..	1,233,200,000	

An idea of the growth of the city's passenger traffic during the past 30 years may be obtained from the fact that in 1910 the total number of passengers carried was 323,000,000, almost entirely by the tramways. The total for the first ten months of the present year is given as 1,129,000,000, an increase of 0.96 per cent. over the corresponding period of the previous year.

Institution of Locomotive Engineers (South American Centre)

The annual general meeting of this Centre was held in Buenos Aires on December 22. Mr. Frank Campbell, Chairman of the Centre, presided. The annual report was read by the Honorary Secretary, Mr. M. D. Lowndes, who informed the meeting that a request had been received from headquarters in London that special efforts be made to carry on the activities of the Centre during the war, through the medium of the reading and discussion of papers. The council had agreed that this should be done, and as it was considered that no calls should be made on the British-owned railways for transport facilities, it had been decided that most of the meetings during the coming session should be held in Buenos Aires or the immediate vicinity. No officers were elected, as those at present serving on the committee had another year to go before completing their term. At the conclusion of the annual meeting, six papers were read by the following graduate members: Messrs. H. F. Jung, T. W. J. Moore, T. A. Spalding,

A. H. Davis, J. M. Worsley and T. G. Knight.

Harvest Prospects for 1939-40

The forecast previously made in these columns that the coming wheat and linseed harvest was likely to be considerably smaller than that of the preceding year, has been confirmed by the figures contained in the first official estimate issued by the Ministry of Agriculture, which puts this year's wheat crop at some 5,150,000 tons (56 per cent.) lower than that of the previous season, when production amounted to the record total of 9,150,000 tons. The linseed crop is estimated at 160,000 tons lower than in 1938-39. The heavy drop in wheat production is attributed not only to the damage, caused by abnormal rainfall and unseasonable frosts but also to the smaller area sown, which was 1,200,000 hectares (3,000,000 acres) fewer than in the previous year. The following table shows the estimated production in tons of each of the four principal crops:—

	Tons
Wheat ..	4,000,000
Linseed ..	1,250,000
Oats ..	900,000
Barley ..	750,000

UNITED STATES

America's Largest Radio Star

Every day, except Sunday, the Pan-American, premier train of the Louisville & Nashville R.R., goes "on the air" from station WSM at Nashville, which, incidentally, breaks all records in the U.S.A. with a radio mast 878 ft. high. The broadcast is timed for 5.8 p.m., and to the railway mind perhaps its most remarkable feature is the strict punctuality of operating which makes it possible to record from one fixed location the passing of an express at the same time daily.

A considerable amount of experimenting was necessary in order to determine the best position for the microphone, which is now housed in a signal tower at Vine Hill, just outside Nashville, where the L. & N. crosses the Tennessee Central R.R. on the level; this right-angle crossing is of considerable value in producing the desired sound effects. By an electrical contact 3,000 ft. from Vine Hill the Pan-American advertises its approach, telephone circuits warn all concerned, and the announcer in the Nashville studio immediately begins a brief announcement concerning the train. A post 1,200 ft. north of Vine Hill marks the point where the driver opens his whistle, continuing until he has passed the microphone, and as the train fades out some interesting fact about the express or the railway concludes the broadcast, the whole having occupied about two minutes.

This daily radio performance of a train is said to be immensely popular, and brings letters from all over North America—from Cuba to Canada—asking all kinds of questions and making suggestions. The nickname of the Louisville & Nashville in this part of the

U.S.A. is "Old Reliable," and this daily "on time" performance of America's largest radio star, at 5.8 p.m., must add considerably to the company's reliability reputation.

GERMANY

Opening of the Kosel-Gleiwitz Canal

On December 8 the new Adolf Hitler Canal, from Kosel on the Oder to Gleiwitz, in the Silesian coal district, was opened by Dr. Dormmüller, Minister of Transport. It replaces one planned by Frederick the Great and called the Klodnitz canal, opened finally in 1822, but has a much greater capacity, being able to take vessels up to 750 tonnes, the largest at present able to use the river between Kosel and Breslau. Certain works are, however, already constructed on a 1,000 tonnes basis, as it is intended to improve the Oder later to allow of this tonnage passing. There are six locks, against 18 on the older canal. Although only 41 km. (25½ miles) long, the new one is intended to form an essential element in an internal waterway system which is considered to be of great importance for Germany's future. The Oder-Danube canal, of which the first sod was cut on the same day, is to lead from the Hitler canal to Vienna and Pressburg (Bratislava), following the Oder valley and including 16 locks, 9 on one and 7 on the other side of the watershed.

In his address Dr. Dormmüller gave an historical sketch of the efforts made hitherto to bring such a plan to fruition and which the political changes of recent years, especially the establishment of the German protectorate in Bohemia and Moravia, have facilitated. It is also intended, he said, to carry out considerable improvements to the Oder and build locks on a deviation of large capacity, in order to avoid some of the worst parts which form a great hindrance to navigation. For the districts it passes through, the Oder is to be another Rhine. The route of the new canal measures 320 km. (almost 200 miles) and the work is to be pushed forward in spite of the war. A prolongation of the Hitler canal to the Vistula would serve to extend German mercantile influence eastwards over a large area. It is the intention in every way to facilitate Germany's connections with the Near East; the new canal systems will be an important link in this plan.

SPAIN

Madrid Metro Extension

Under a decree approved at the meeting of the Council of Ministers on January 26, the Metropolitan Railway Company of Madrid was conceded a prolongation of the period originally fixed for the construction of the section from Puerta del Sol, via Plaza Callao, to Plaza de España and Arguelles, with the extension Goya-Bulevares-Arguelles. Work on this extension was suspended during the civil war.

SINGLE LINE SIGNALLING IN VICTORIA

The lever lock and track control system has been introduced on several single-line sections of the Victorian Railways to provide improved facilities

WHAT is called in Victoria the lever locking and track control system of signalling for single lines of railway was developed by the Signal & Telegraph Division of the Victorian Railways and first introduced in 1926 on the single line section of the Darling suburban line, in place of the electric staff system formerly in use between Heyington and Darling.

It originated in the track circuit controlled absolute permissive automatic signalling. With the addition of comparatively inexpensive electrical devices to existing mechanical signalling equipment, the benefits of single line automatic signalling, such as increased track capacity, are obtained from the present two-position mechanical signal and interlocking installations, without the high cost involved in a complete changeover to automatic signalling and resultant displacement of much perfectly serviceable signalling material.

Principles of Working

Under the lever locking and track control system, the track is subdivided into so-called single line sections between adjacent crossing stations; these may be again sub-divided into track sections, the entrance to each of which is governed by a home signal equipped with an electric reverser and a train stop.

The objects of the system are to prevent two trains travelling in opposite directions being in a single line section at one time, and to prevent more than one train being in a track section at one time.

The entrance to each single line section is governed by a departure home, or block entering, signal, equipped with electric reverser and train stop. An interlocked control lever is provided at each crossing station for each single line section, equipped with an electric lock which prevents the operation of the lever unless the entire single line section is unoccupied and the opposing departure home signal and train stop at its opposite end are in the "stop" position. As this control lever is interlocked with the levers operating the points for opposing movements, an emergency time release apparatus is provided for use when necessary. If this is set in action, both departure home signals are held in the "stop" position until it has been reset.

The electric train stop working in conjunction with a departure home signal is lowered to the "clear" position when the control lever at the opposite end of the single line section is reversed, and this control lever locks the departure home signal lever at its own end in the normal position.

Process of Signalling

If a train is to proceed from crossing station "A" to crossing station "B," the signalman at "A" sends the "release control" signal on the electric bell. If "B" agrees to accept the train he places his control lever to the full "reverse" position and acknowledges the bell signal by a return ring. The reversing of the "B" control lever clears the train stop protecting the entrance to the single line section at "A," permitting the departure home signal there to be pulled off for the train to proceed towards "B." On entering the section the

train reverses that signal and its train stop to the "stop" position, at the same time locking the control lever at "B" reversed, until it has arrived clear of the fouling point at "B."

Following Movements

Where the single line section is subdivided into two track sections the train stop will clear and the departure home signal will become free to be operated when the train has proceeded beyond the protecting home signal at the intermediate control point, but both control levers will remain locked during the whole of the time any train is in the single line section. Two following trains are therefore permitted to proceed simultaneously through a single line section consisting of two or more track or block sections, but simultaneous occupation by opposing trains is prevented. Indication lights over the signal and control levers serve to inform the signalmen when they are free to be operated.

Working in Case of Failure

In order to provide for train operation during failures a pilotman's key is provided for each single line section, giving the person carrying it authority to pilot a train past a departure home signal at "stop" as far as the next crossing station. The pilot key is divided into two sections, one being normally secured in an instrument at each end of the single line section. The removal of a half pilot key from its instrument prevents the operation of the departure home signal at that end of the single line section. When the two halves have been secured and screwed together to form the authority to pilot trains through the section both departure home signals are thereby secured at the "stop" position, ensuring that while such working is in force no other train can be admitted to the single line section.

This system of signalling has proved completely satisfactory and reliable in operation and has been installed on several other single line sections in the Melbourne electric suburban area, namely: Clifton Hill "B" box to Westgarth, and Alphington to Heidelberg, on the Hurstbridge line, Darling to East Malvern, on the Glen Waverley line; Camberwell to Riversdale, on the Ashburton line; and Northcote Loop junction to North Fitzroy "A" box, on the North Carlton line. The total route-mileage so worked is 8½ miles.

TOOLMAKER'S ENTERPRISE.—Macrome Limited, of Hay Mills, Birmingham, whose slogan "The Toughest Tools in the World" has been substantiated by many internationally-known companies, is adopting a bold policy of increased advertising. The advertising department has been extended and the staff increased. "Industry must go on," is the Macrome viewpoint. "We hope that other firms will follow our lead and so help to win the war and defeat the possibility of a following slump." The example set by Macrome Limited, which shows great confidence in the company's own products, provides a pointer for tool buyers.

BRITISH WARTIME TRAIN SERVICES

A summary of the improvements in the frequency and speed of long-distance services, now operating, as compared with the first emergency services of October, 1939, and the war services of 1918

IN the issues of THE RAILWAY GAZETTE for September 29, October 6, 13, and 20, 1939, an analysis was given of the emergency train services introduced shortly after the outbreak of war by the four British main-line railways, comparing the facilities offered with those in operation in the closing months of the 1914-19 war, and also with the normal winter service of October, 1938. Since October last, it has been found possible in considerable measure to restore the long-distance services that had been withdrawn, and also to accelerate the trains, the previous limit of 45 m.p.h. average speed from start to stop having been increased to 50 m.p.h. On the L.N.E.R. these improved services were brought into operation on December 4, 1939; on the L.M.S.R. partly on the same date and partly on January 1, 1940; on the S.R. on January 1; and on the G.W.R. on February 5; the principal changes have been reviewed in detail, as they were made, in "Transport Services and the War." The present article is designed to compare the train services now in operation with those of 1918, 1938, and the closing months of 1939, on the same statistical basis as before, in order that the extent of these recent improvements may be realised. As previously, ten representative cities and towns have been selected on each system, and the table shows the fastest service operating between London and each of these places, the number of express services provided daily, and their average journey time. In arriving at the frequency figures, care has been taken as far as possible to avoid trains which duplicate facilities by arriving or departing at closely corresponding times, or trains which are overtaken *en route* by other and faster services. The purpose is to indicate the maximum extent of the alternative facilities available; and in all such cases the quicker train of the two has been included in the averages.

The first point of interest is to compare the services now operating, with prospects of continuity for some time to come, with those in force in October, 1918. In doing so, it should be remembered that the 1918 train services were the product of gradual attrition and deceleration which had been going on over a period of more than three years; whereas the services now in force have been reached after no more than three to five months of warfare. Of fastest times to or from London figuring in the table, the only ones which still remain longer than those of October, 1918, are, on the L.N.E.R., Cambridge (7 min.), Nottingham (40 min.), and Sheffield (28 min.); and on the G.W.R., Oxford (7 min.), Bristol (15 min.), and Weymouth (23 min.); still within 5 min. of the 1918 times are Leicester, Leeds, and Perth, L.M.S.R.; Norwich, L.N.E.R.; Birmingham, Exeter, and Swansea, G.W.R.; and Salisbury and Plymouth, S.R. As to average journey times, stations still worse off than in October, 1918, are, on the L.M.S.R., Leicester (2 min.), and Leeds (2 min.); on the L.N.E.R., Cambridge (8 min.), Nottingham (25 min.), and Sheffield (18 min.); on the G.W.R., Oxford (12 min.), Bristol (6 min.), and Weymouth (21 min.); and on the Southern Railway, Bournemouth (6 min.). The qualification may be made in the matter of Cambridge, Oxford, and Bournemouth that a considerably greater number of trains is comprised in the 1940 averages than in those of 1918. Comparison of the frequency columns shows that this is a general characteristic of the current

services, 28 out of 40 being more frequent than those in force at the end of the last war.

In comparing the present services with those of a normal winter (October, 1938), it will be seen that on a percentage basis, those covering the longest distances have suffered the most in frequency and the least in average speed. Taking an average of the figures in these tables, in the first emergency services of the present war the L.N.E.R. reduced its train frequency by an average of 47 per cent., the L.M.S.R. by 42 per cent., the S.R. by 36 per cent., and the G.W.R. by 33 per cent. In the augmented services now in force the L.M.S.R. loss of frequency is improved to 32 per cent., the S.R. to 31 per cent., the L.N.E.R. to 26 per cent., and the G.W.R. to 19 per cent. These averages show that the G.W.R. has effected the least severe reduction in passenger train services of the four groups. As to average journey times, in the first emergency services of October last (again with figures based on this table), the L.M.S.R. increased its duration of journey by 37 per cent., the L.N.E.R. by 32 per cent., the G.W.R. by 28 per cent., and the S.R. by 12 per cent.; the present timetables have reduced these figures to 25, 20, 19, and 9 per cent. respectively. From these averages it would appear that of the four main-line railways the Southern is maintaining its services the most nearly at their normal speeds. It must, however, be borne in mind that in a reduction of speeds to one common figure—whether maximum running speeds or average start-to-stop speeds—the lines which have established the highest general standard of speed must of necessity suffer the most; this applies to the L.N.E.R., with its streamline trains and their connections, and the L.M.S.R., with the mile-a-minute standard between stops so widely operative on the Western and Midland Divisions up to the war. Averaging the reduction of frequency and the increase of time, the four main-line railways now have closely corresponding figures to represent the general worsening of service—28½ per cent. on the L.M.S.R., 26 per cent. on the L.N.E.R., 20 per cent. on the S.R., and 19 per cent. on the G.W.R. A general average for all four companies shows that a 40 per cent. reduction in train services in the October, 1939, timetables had been mitigated to 27 per cent. in February, 1940; and an increase by 27 per cent. in overall journey times in the former had been reduced to 18 per cent. in the latter.

A few words are necessary, in conclusion, concerning individual services, as there has been considerable variation in the degree in which timetables have been restored to normal. As previously noted, the services covering the longest distances have come off best in the matter of time and worst in frequency. For example, average times between Euston and Glasgow, Perth, and Inverness are 10, 10, and 3 per cent. only over normal, but frequency is halved in each case. Between King's Cross and Newcastle, Edinburgh, and Aberdeen time is increased by 16, 15, and 9 per cent., but frequency is cut by 38, 40, and 33 per cent. respectively. It is not without interest that the present timing of the down Flying Scotsman between King's Cross and Edinburgh is only 10 min. longer than that which was in operation up to the 1932 accelerations. But the cities in the Midlands are still the worst sufferers as regards their communications with London. From

WAR MAIN-LINE TIMETABLES, FEBRUARY, 1940

FASTEST AND AVERAGE TIMES AND FREQUENCY OF SERVICE BETWEEN LONDON AND VARIOUS PROVINCIAL CENTRES IN 1918, 1938, 1939, AND 1940

London and :—	Distance	Fastest times				No. of trains daily				Average times			
		Oct., 1918	Oct., 1938	Oct., 1939	Feb., 1940	Oct., 1918	Oct., 1938	Oct., 1939	Feb., 1940	Oct., 1918	Oct., 1938	Oct., 1939	Feb., 1940
	miles	h. m.	h. m.	h. m.	h. m.					h. m.	h. m.	h. m.	h. m.
L.M.S.R.													
Leicester	99.1	2 15	1 39	2 31	2 10	18	30	16	18	2 33	1 48	2 46	2 35
Birmingham .. .	112.9	2 40	1 55	2 41	2 24	11	20	15	18	2 53	2 05	3 10	2 51
Nottingham .. .	123.5	2 55	2 03	3 06	2 45	12	21	12	15	3 07	2 25	3 31	3 14
Sheffield .. .	158.5	4 01	2 56	4 25	3 49	12	20	10	14	4 24	3 12	4 44	4 20
Manchester (a) ..	188.5	4 35	3 15	4 32	3 50	16	22	14	18	5 10	3 43	4 52	4 34
Liverpool .. .	193.7	4 40	3 15	4 40	4 10	12	14	12	12	5 03	3 39	5 02	4 34
Leeds .. .	196.0	4 47	3 48	5 35	4 44	12	16	8	12	5 25	4 06	6 03	5 27
Glasgow .. .	401.4	9 30	* 6 30	9 35	8 45	6	12	6	6	10 20	8 06	10 04	8 53
Perth .. .	450.4	10 10	8 41	11 12	10 05	6	8	4	4	11 19	9 30	11 31	10 25
Inverness .. .	568.4	15 55	13 00	16 14	14 22	3	4	2	2	16 28	14 30	16 26	14 56
L.N.E.R.													
Cambridge .. .	55.7	1 19	1 05	1 33	1 26	15	40	16	24	1 34	1 20	1 43	1 42
Peterborough ..	76.4	1 38	1 16	1 42	1 32	22	30	18	27	1 50	1 30	1 50	1 36
Norwich .. .	115.0	2 52	2 10	3 18	2 50	14	18	12	15	3 42	2 50	3 26	3 20
Nottingham (b) ..	126.5	2 27	2 16	3 17	3 07	16	18	12	14	2 57	2 38	3 36	3 22
Sheffield (b) ..	164.7	3 22	3 00	4 27	3 50	14	21	14	15	4 02	3 29	5 12	4 20
Leeds .. .	185.8	4 32	* 2 43	4 28	4 20	10	18	8	12	4 52	3 37	5 00	4 39
Hull .. .	196.9	4 55	3 30	5 20	4 35	10	14	5	14	5 29	4 06	5 32	5 06
Newcastle .. .	268.3	5 55	* 3 57	6 31	5 39	12	21	12	13	6 40	5 15	6 56	6 04
Edinburgh .. .	392.7	9 40	* 6 00	9 40	8 25	8	15	8	9	9 52	7 46	10 08	8 57
Aberdeen .. .	523.2	13 30	† 9 45	13 45	12 21	5	12	5	8	15 04	11 53	14 52	13 00
G.W.R.													
Oxford .. .	63.5	1 18	1 00	1 28	1 25	14	26	20	26	1 30	1 20	1 39	1 42
Birmingham ..	110.6	2 30	2 00	2 33	2 28	10	14	8	11	2 46	2 05	2 51	2 33
Bristol .. .	118.3	2 15	1 45	2 35	2 30	16	20	14	18	2 45	2 15	2 58	2 51
Worcester .. .	120.4	3 06	2 10	3 06	2 53	8	12	8	10	3 41	2 37	3 20	3 17
Cardiff .. .	145.1	3 10	2 41	3 15	3 03	10	14	8	12	3 23	2 55	3 23	3 16
Weymouth .. .	168.8	3 45	3 07	4 08	4 08	6	12	9	9	4 22	3 59	4 51	4 43
Exeter .. .	173.5	3 30	2 50	4 30	3 30	15	19	11	11	4 31	3 42	4 52	4 05
Swansea .. .	190.9	4 35	3 57	4 40	4 30	10	14	9	12	5 07	4 08	4 57	4 40
Plymouth (North Road)	225.5	5 00	4 05	5 45	4 51	8	12	9	10	5 39	4 44	6 26	5 33
Penzance .. .	305.0	7 55	6 30	8 35	7 30	6	9	6	6	9 11	7 18	9 35	8 17
S.R.													
Brighton .. .	50.9	1 15	1 00	1 00	1 00	34	100	46	53	1 30	1 09	1 11	1 11
Hastings (c) ..	62.4	1 48	1 32	1 38	1 38	25	50	22	22	2 27	1 52	1 59	1 57
Portsmouth (d) ..	73.6	2 12	1 30	1 37	1 37	24	45	40	40	2 53	1 38	1 58	1 58
Margate (e) ..	73.9	2 04	1 30	1 38	1 38	18	28	20	21	2 34	2 03	2 20	2 08
Dover .. .	77.3	2 27	1 32	1 52	1 55	17	32	22	22	2 46	2 06	2 19	2 15
Southampton ..	79.2	1 43	1 25	1 46	1 35	20	28	20	20	2 16	1 50	2 03	1 59
Salisbury .. .	83.8	1 43	1 26	1 48	1 42	15	26	16	17	2 15	2 02	2 08	2 04
Bournemouth ..	107.9	2 39	1 56	2 30	2 15	12	26	17	18	2 52	2 33	3 04	2 58
Exeter .. .	171.8	3 57	3 09	3 50	3 38	11	13	9	11	4 38	3 42	4 15	4 09
Plymouth (North Road)	230.9	5 55	4 43	6 06	5 52	8	12	7	9	6 32	5 45	6 22	6 17

(a) Via Western and Midland routes. (b) Via G.N. and G.C. routes. (c) Via Tonbridge and via Lewes. (d) Via L.S.W. and L.B.S.C. routes in 1918; via Guildford only in 1938, 1939 and 1940. (e) Via Canterbury only in 1918; via Ashford and via Canterbury in 1938, 1939, and 1940. * By streamline train. † By streamline train between Edinburgh and London.

St. Pancras, Leicester is 43 per cent. further off in time, Nottingham 34 per cent., Sheffield 35 per cent., and Leeds 33 per cent., frequency of service having also been reduced by 40, 29, 30, and 25 per cent. respectively. Similarly on the L.N.E.R., the average increases in time between King's Cross or Marylebone and Nottingham, Sheffield, and Leeds are 28, 24, and 29 per cent., and the average curtailment of frequency 28, 24, and 29 per cent. On the other hand Hull, which had lost 64 per cent. of its trains, now has a practically full service restored, though 24 per cent. slower than normally. On the Great Western Railway the South Wales service is the nearest to normal, now only 14 per cent. below pre-war frequency and 12-13 per cent. below its regular winter speed; the Bristol service, on the other hand, shows a 27 per cent. decline in speed. On the Southern Railway the dense electric services between London and the South Coast naturally show the

biggest reductions, as 47 per cent. in the case of Brighton; steam cuts are 35 per cent. Salisbury, 31 per cent. Dover and Bournemouth, and 29 per cent. Southampton; but average speeds are so well maintained that there have been increases of only 2 per cent. to and from Salisbury, 3 per cent. Brighton, 4 per cent. Hastings and Margate, 7 per cent. Dover, and 8 per cent. Southampton.

The fastest start-to-stop runs in Great Britain at the present time are being operated by the Southern Railway. With electricity the quickest runs are from Three Bridges to East Croydon, 19.0 miles in 21 min. at 54.3 m.p.h., and from London Bridge to Haywards Heath, 37.8 miles in 42 min., at 54.0 m.p.h., the latter train reaching Brighton in 61 min., with two intermediate stops. With steam three West of England expresses are booked over the 66.4 miles from Andover to Waterloo in 76 min., at 52.4 m.p.h.

TRACK STRESS RESEARCH

Progress of research into permissible axleloads and speeds in India has now been recorded

In November, 1935, the Railway Department of the Government of India appointed Messrs. W. E. Gelson and E. A. Blackwood to undertake research into the permissible axleloads and speeds on various types of track existing in India. A progress report covering the period November, 1935 to November, 1938, has now been published. Those whose interest is centred in permanent way will find much of importance by detailed study of the report itself.* Brief reference may, however, be made here to the more outstanding conclusions which have resulted from three years' intensive study.

The terms of reference were substantially as follow :—

(1) To verify or otherwise the speed allowance formula, *vide* Item D (4) of Technical Paper 245, *i.e.*, "The Report of the Bridge Sub-committee on Track Stresses." (Govt. of India Central Publication Branch, Calcutta, 1925.)

(2) To investigate the increment of stress over and above the static effect which may be expected under normal conditions from track defects such as low points, rail joints or non-uniformity in the support offered by adjacent sleepers.

(3) To investigate the conditions of support at rail joints and what reliance may be placed on the rail continuity effect of fishplates, new and worn, and the effect of closer sleeper spacing.

(4) To investigate the stability in the ballast of various types and designs of sleepers as regards reducing maintenance while preserving a level track surface.

(5) To investigate the effects on rails and sleepers of the lateral forces set up by the hunting movement of locomotives at speed on straight and curved track.

As regards Items (1) and (2) the investigators found that the actual static deflections and stresses ascertained by experiment are in reasonably close agreement with the values calculated in accordance with the formulae and theory which has had general acceptance on Indian railways since 1925. That is, under ideal track conditions, if a concentrated vertical load P is applied to a rail of infinite length in both directions, supported on a continuous elastic foundation which provides a vertical reaction μy per unit length, the depression of the rail at a positive distance x from P is given by

$$y = \frac{P}{8\beta^3 EI} e^{-\beta x} (\cos \beta x + \sin \beta x)$$

where

$$\beta = \sqrt[4]{\frac{\mu}{4EI}}$$

E = the modulus of elasticity of the rail steel

I = the moment of inertia of one rail

and μ = the vertical elastic modulus of the track, *i.e.*, the number of force units per unit length of rail required to produce a uniform unit depression of the rail.

This is a solution of the equation :

$$EI \frac{\delta^4 y}{\delta x^4} + \mu y = 0$$

The bending moment under these conditions is given by

$$M = -EI \frac{\delta^2 y}{\delta x^2} \\ = -\frac{P}{4\beta} e^{-\beta x} (\sin \beta x - \cos \beta x)$$

Maximum depression and maximum bending moment occur under P , *i.e.*, when $x = 0$, and are given respectively by

$$\Delta = \frac{P}{8\beta^3 EI} = \frac{P\beta}{2\mu}$$

$$\text{and } M = \frac{P}{4\beta}$$

The distance to the point of contraflexure

$$x_1 = \frac{\pi}{4} \sqrt{\frac{4EI}{\mu}}$$

The discrepancies between theory and practice were found to be due chiefly to the following causes :—

(a) Vehicle characteristics, including imperfect springing. In the case of locomotives having non-compensated springs, variation in wheel loads up to 40 per cent. were common.

(b) Contact stresses in the rail head.

(c) Low and high spots in the track had an important effect and one directly dependent upon the standard of track maintenance.

(d) Non-uniform contact pressure between rail and chair or bearing plate.

(e) Eccentricity of contact between tyre and rail table.

(f) Canting of rails and coning of tyres appear to cause increase of secondary stresses in rails.

(g) Relief in bending stress due to arching of rail supports. The relief of stress found experimentally was 7 per cent. in the head and 23 per cent. in the foot.

(h) Modified value of elastic constant at points some distance from the load where reactions are negative. They are only appreciable when considering reversal stresses, especially under wagon axles and bogie stock.

The investigators found by exhaustive tests that the dynamic deflection did not exceed a value given by multiplying the static deflection or sleeper load by $(1.10 + 0.0037 V)$, where V is the speed in miles per hour. The only exception was in the case of multiple-unit G.I.P. suburban stock on 100 lb. b.-h. curved track, and it is suggested that this may be due to rolling of the super-structures and is probably characteristic of the type of vehicle.

The dynamic stresses due to all causes such as hammer blow, etc., as measured were found to be covered when the calculated static bending stress was multiplied by the following (V = speed in m.p.h.) :—

Broad gauge	22½-ton wagon, axles 16 ft. centres, 88½-lb. track and heavier	(1.24 + 0.007 V)
Broad gauge	wagon as above, tracks below 88½ lb.	(1.3 + 0.014 V)
Broad gauge	4-6-0 "D/5" G.I.P. pass. loco., 17½-ton axles, 82 lb. track and heavier	(1.8 + 0.012 V)
Broad gauge	4-6-2 G.I.P. electric pass. loco., 20-ton axles, 100 lb. track and heavier	(1.9 + 0.012 V)
Metre gauge	10-ton wagon, axles 12 ft. centres, 50-lb. track and heavier	(1.5 + 0.014 V)
Metre gauge	"YV" class Pacific loco. 50-lb. track and heavier	(2.0 + 0.019 V)

It will be noted that these figures indicate that increased speeds result in appreciable increment in rail stresses.

In order that there shall be no permanent rail distortion with consequent increase in track maintenance, maximum

* "Track Stress Research," November, 1935, to November, 1938. Progress Report, Vols. I and II. By W. E. Gelson and E. A. Blackwood. Calcutta: E. I. R. Press. Rs.10 or 16s.

compressive and tensile stresses should not exceed 18 tons per sq. in. and 23.4 tons per sq. in. for rails of 40 and 52 tons per sq. in. ultimate tensile strength respectively. But if the maximum reversal stress never exceeds — 0.30 times the maximum positive stress the above figures may be increased to 22.8 and 29.6 tons per sq. in.

The alternative to the use of such high working stresses would be to separate secondary effects such as cross bending and contact stresses from those due to vertical bending moment, and adopt a lower working stress for the latter to allow for the secondary stresses which form a large proportion of the total rail stress.

Much attention has been given to rail joints, and formulae are given from which sleeper spacing, deflection and fish-plate stress may be derived. It has been found that stronger fishplates are urgently needed to facilitate maintenance work. It is considered that rail joints of inadequate strength are the cause of much of the impact effect.

[Track maintenance has a most important bearing upon the impact effect. The lighter the rail for a given axle-load, the greater the impact effect. It can be reduced by increasing the number of sleepers.

As regards Item 4 of the terms of reference, experiments to date show that the shape of the sleeper has no noticeable influence on its deflection under a given load, but the whole question of stress distribution between sleeper and subsoil requires investigation.

So far as the lateral strength of track is concerned it is recommended that further investigation be made on curved track, it being considered that, if rolling stock were suitably designed to reduce nosing on the sharper main-line curves,

the reduction in secondary stresses from this cause might offset the increased stress due to centrifugal effects.

Generally speaking, the investigators have come to various conclusions as regards lateral strength, most of which refer to different types of sleepers in use on Indian railways, but the following are of general interest :—

(1) Lateral strength of track depends upon the time it has had to consolidate after relaying or repacking.

(2) The type of rail has no appreciable effect on ultimate lateral strength.

(3) All types of D. & O. plate track and steel trough sleeper track appear to have much greater lateral strength than track laid on hardwood sleepers, the relative values of the lateral load where permanent distortion takes place after 7 applications of the load being :—

for 90 R. Hardwood N + 3	5.6 tons
88½ D. & O. N + 4 + D	7.0 "
90 R. steel trough N + 3	8.6 "
88½ D. & O. N + 2	8.6 "

(4) Tests have shown that lateral strength depends chiefly upon the sleeper spacing and the value of the grip they take in the ballast. It may with safety be taken to vary inversely as \sqrt{l} , where l equals the sleeper spacing.

(5) A definite increase in lateral resistance on account of end boxing can be detected in the no-load tests, but it is small. The advantage of boxing lies in its providing a surcharge which protects the packing ballast from disturbance.

(6) Ability of track to maintain good fettle is an important feature. If one type of track loses its fettle more quickly than another it will have to resist longer disturbing forces, although it may have greater lateral resistance.

L.N.E.R. London Electrification

Despite the war the civil engineering works in the L.N.E.R. scheme for electrifying its suburban lines from Liverpool Street and Fenchurch Street to Shenfield are to be pressed to a conclusion. The major portion is under construction and contracts have been let for practically all the remainder. Good progress has already been made.

At Liverpool Street station a large overbridge carrying Primrose Street over the railway has been reconstructed; another carrying Worship Street is nearing completion, and the work of reconstructing Shoreditch High Street overbridge will be shortly commenced. Heavy retaining walls have also been built. Between Liverpool Street and Stratford a considerable number of bridges have been reconstructed and widened, and long lengths of retaining walls built, together with incidental works.

At Stratford the interchange station with the Central Line tube extension is now taking shape, and work is in

progress in connection with the enlargement and improvement of Maryland Point station. Preliminary works for the enlargement and improvement of Forest Gate and Manor Park stations have already been carried out in preparation for the reconstruction of station buildings. At Ilford the flyover viaduct is nearing completion, and the site has been cleared for the new carriage sheds for the stabling and repair of the new electric trains. Minor alterations have also been completed at a number of places between Ilford and Shenfield.

The scheme includes the resignalling of the line and the installation of modern colour-light signalling. A start has already been made on the ground, and it is intended that as the works are completed they will be brought into use for the existing steam services, pending completion of the electrification works. New power-operated signal boxes containing the most modern equipment are to be provided at Liverpool Street and Stratford.

Portuguese National Railway Company

The system operated by the Portuguese National Railway Company consists of the Tua-Bragança line (135 km.) and the Santa Comba—Vizeu line (50 km.), both of which belong to the company, and the Regua—Chaves (98 km.) and Pocinho—Miranda (106 km.) lines, which belong to the State. The total length of line worked by the company therefore aggregated 389 km., an increase of 33 km. over the previous year. All the lines were worked at a loss in 1938. Gross earnings amounted to 6,343 contos, and expenditure to 7,331 contos. Financial charges required 444 contos and 59 contos were carried to the renewal fund of leased lines, leaving a total deficit of 1,491 contos. Principal traffic statistics for all the lines operated were :—

	1937	1938
Passengers, number	447,073	410,505
Goods, tons	137,106	122,297
Train kilometres	529,834	550,356
	contos	contos
Passenger receipts	2,387	2,393
Goods receipts	4,211	3,698

Ratio of working was 108.2 per cent. for the owned lines and 117.4 per cent. for the leased lines. Passenger receipts showed a slight improvement in spite of the reduction in number, owing to the surcharge. The decrease in merchandise traffic is attributed to the unrestricted competition of road motor vehicles, and no improvement is to be expected until some measure of regulation is introduced in transport generally.

REDESIGNED 4-6-2 LOCOMOTIVES, LEOPOLDINA RAILWAY

The firebox and ashpan of these metre-gauge locomotives have been altered to burn Brazilian coal, necessitating a general redesigning of the back end of the engine

THE 4-6-2 type locomotives illustrated and described herewith have been redesigned and built by Beyer Peacock & Co. Ltd. for the Leopoldina Railway, Brazil. In their old form they have proved a very successful type and have run the principal passenger services on this important metre-gauge Brazilian railway for many years; the boiler was formerly designed for burning Welsh coal or briquette fuel. The new engines under review comprise an order for six and it is worthy of note that, despite the exigencies of war and although entailing a considerable amount of new design work, the locomotives, ordered in April, 1939, were shipped in November and December and were all landed in Brazil by January, 1940.

The new locomotives have been built to the specific requirements of Mr. H. E. T. Vogel, Locomotive Superintendent of the railway, and under the supervision and to the inspection of the Consulting Engineers, Messrs. Livesey & Henderson. While naturally embodying certain minor alterations and improvements based on long experience with these engines in service, the specifications also called for the entire redesigning of the firebox, ashpan and back end of the engine, etc., to burn Brazilian national coal.

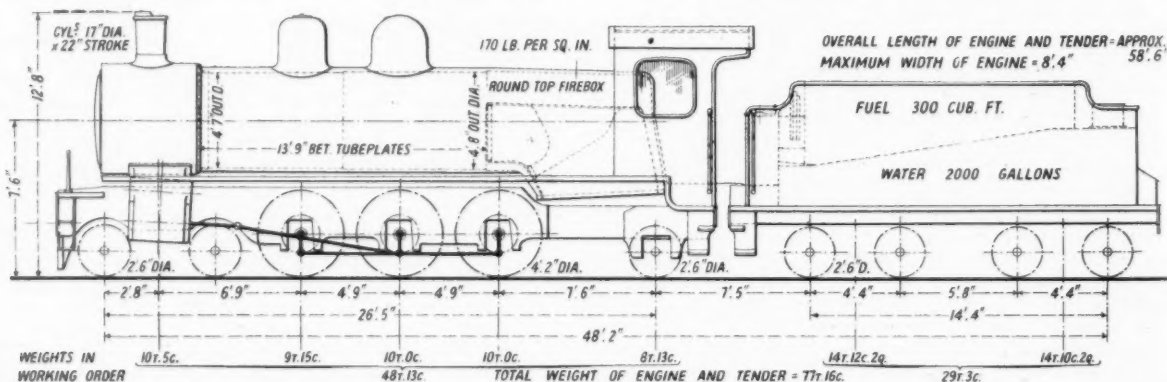
The burning of Brazilian coal in the firebox of a locomotive has always presented a problem to the locomotive designer, not only because of its comparatively low

limitations of the narrow gauge, and, further, the size of existing turntables prohibited any lengthening of the locomotive.

In the new boiler the barrel has been extended over the rear coupled wheels; it has a short combustion chamber to take a round-top firebox of the Wootton type having a large grate area. The firebox is also fitted with two Nicholson thermic syphons, the whole being of Colville's double "Crown" brand steel. The distance between the tube-plates is 13 ft. 9 in. The comparative heating surfaces, etc., of the old and new type of boiler are:—

OLD TYPE		NEW TYPE	
	sq. ft.		sq. ft.
Tubes	917	Tubes	891
Firebox	113	Firebox	151 (includes 2 syphons)
	1,030		1,042
Superheater	150 (inside)	Superheater	224 (inside)
Total	1,180	Total	1,266
Grate area	17.6 sq. ft.	Grate area	30.3 sq. ft.

In order to ascertain the best possible form of grate for burning this particular Brazilian coal, which varies in size from fine dust to lumps of 12 in., the Locomotive Superintendent specified the provision of three types of grates so that a comparison could be made. The locomotives



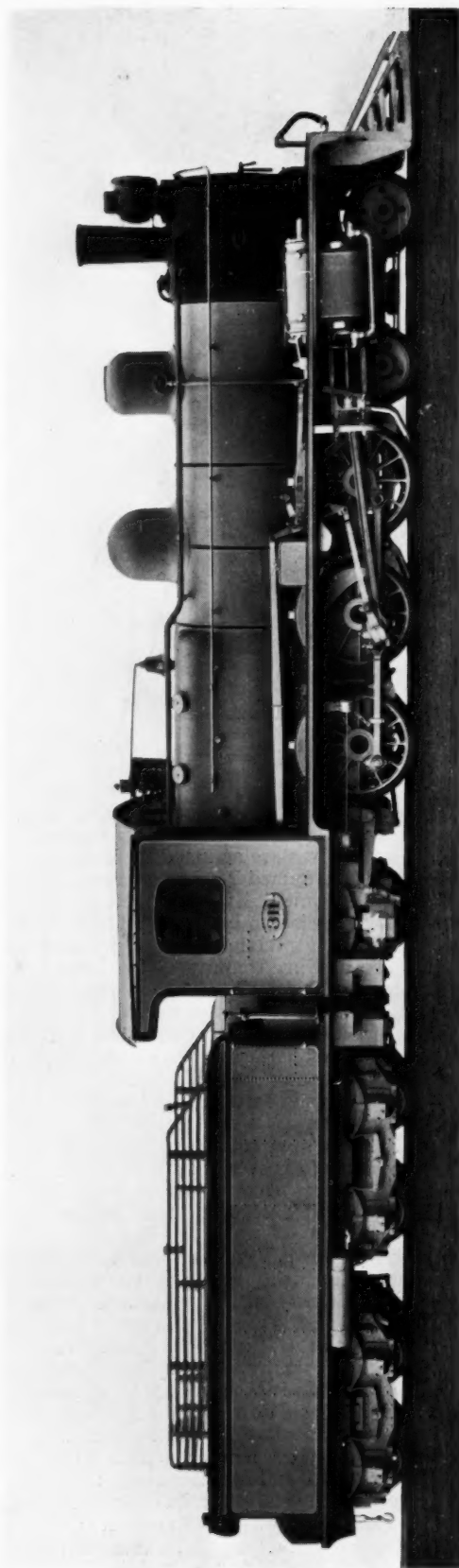
General arrangement drawing of redesigned 4-6-2 locomotive, Leopoldina Railway

calorific value, *i.e.*, about 11,000 B.T.U.s, but also to the very high ash content, which is as much as 33 per cent., and from certain mines reaches 40 per cent., and further the tendency to clinker owing to the amount of pyrites present in the fuel. Thus in attacking this problem it was first necessary to obtain the largest possible grate area and secondly to arrange for an ashpan not only of the highest capacity practicable but also one which was as self-cleaning as possible and with an arrangement of adequate openings, which could be easily operated. To burn this particular fuel a light fire is necessary and therefore the grate should have very little slope and should be of the shaker type to facilitate the easy removal of the ash during the run, while provision was also necessary for the removal of any clinkers that may form.

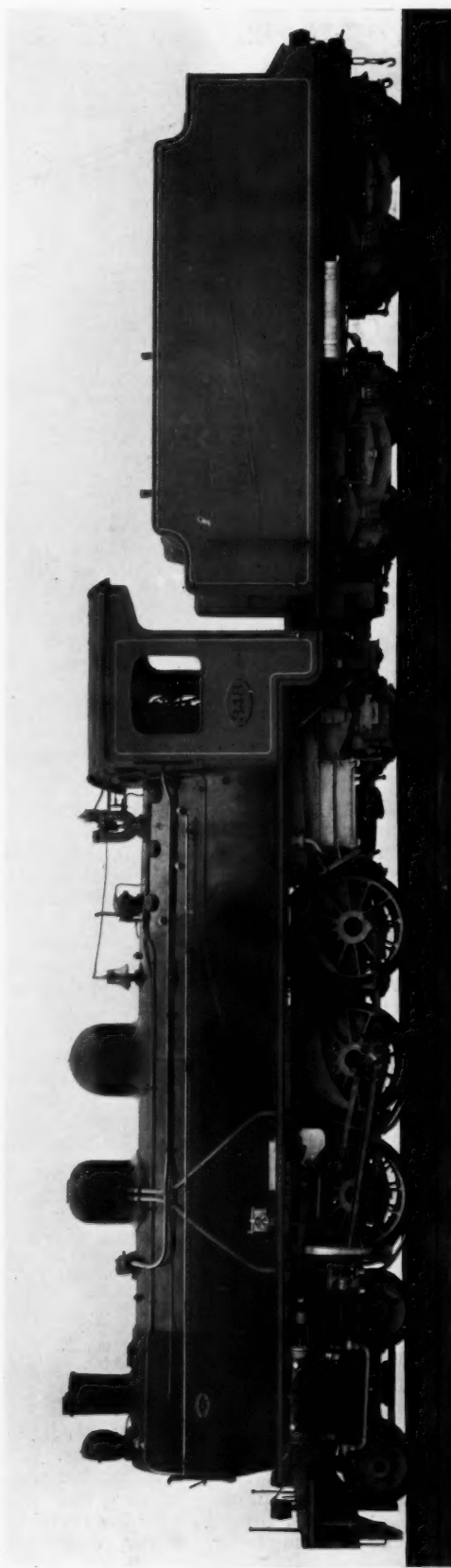
In the analysis of this coal, the fixed carbon averages about 45 per cent. and the volatile matter about 29 per cent.; the water content is about 6 per cent. The difficulty of meeting these requirements was enhanced by the

as delivered are fitted with ordinary rocking finger bars, operated by either steam cylinder or hand lever, with a drop grate in the centre at the front end, which is hand-operated. The other two types of grates supplied are the rocking grate of the "rosebud" type, sometimes described as a table grate, actuated either by steam cylinder or hand lever, with a drop grate similarly placed as in the finger bar grate, also hand-operated and the remaining type of grate supplied is of the Firebar type manufactured by the Waugh Equipment Company of New York, and operated by a hand lever. In this type no drop grate is provided, the special design of the bars effecting the disposal of clinker. The enlarged grate, nearly double the area of the old type, and large ashpan, referred to below, has necessitated the complete redesigning of the back end of the frame, including the radial truck, which has been enlarged to meet the increased axleload.

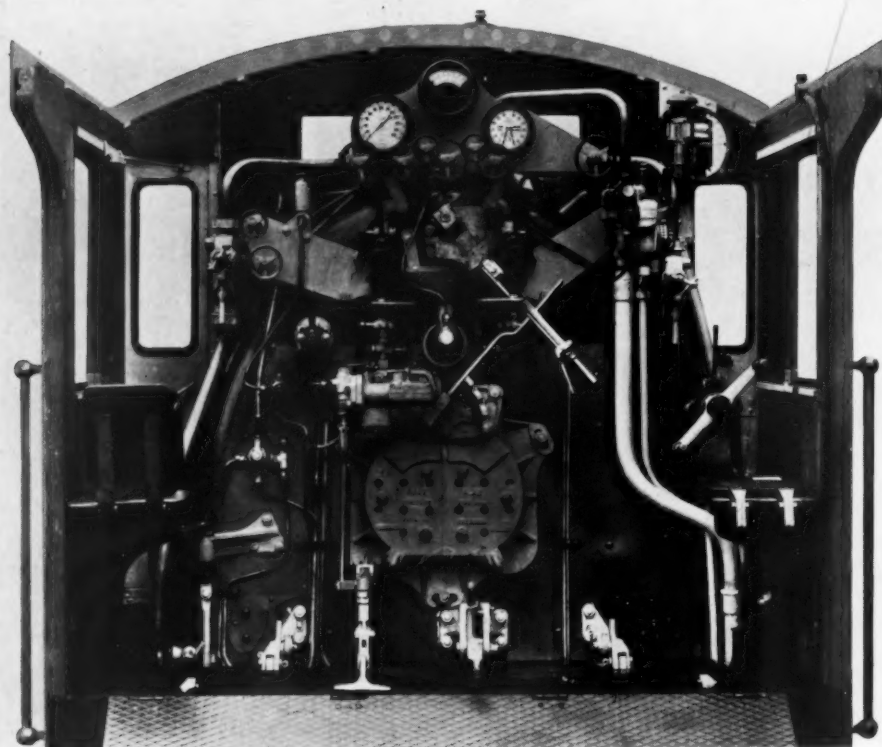
The main plate frames of the engine now terminate below the throat plate and between these frames is rivetted



One of the earlier series 4-6-2 type locomotives built by Beyer Peacock & Co. Ltd. for the Leopoldina Railway



One of the new series 4-6-2 type locomotives, Leopoldina Railway, as redesigned and built by Beyer Peacock & Co. Ltd., Manchester



Cab of redesigned 4-6-2 locomotive for the Leopoldina Railway

a substantial steel casting to which slab frame extensions positioned at a narrower width are rigidly bolted.

As already mentioned it is of the utmost importance that the ashpan should be of the greatest possible capacity with satisfactory arrangements for the expeditious handling of the high ash content of this coal, and considerable thought has been given by the builders to this subject. The ashpan evolved is designed in three portions, namely, a centre pan between the engine frames, fitted with a front air door and hopper bottom with cleaning door; in addition two large side pans are provided on each side of the engine with side air doors and side cleaning doors. All the doors are hand-operated; the front air door of the centre pan and the air doors of the side pans work in unison. Thus the ashpan is made in three distinct portions, each separate and detachable. The principal dimensions of the locomotive are the same as in the original design, but many improvements in detail and fittings have been introduced:—

Cylinders, dia.	17 in.
" stroke	22 in.
Coupled wheels, dia.	4 ft. 2 in.
Boiler pressure	170 lb. per sq. in.
Tractive effort (at 75 per cent. b.p.)	16,210 lb.
" (at 85 per cent. b.p.)	18,370 lb.
Water capacity of tender	2,000 gal.
Coal capacity of tender	300 cu. ft.
Maximum axleload of locomotive	10 tons
Total weight of engine and tender in working order	78 tons

The superheater is of the Superheater Company's manufacture and embodies a multiple valve regulator. The large and small tubes are of Howell's Aquacidox steel. Two of Nathan's No. 8 Monitor injectors deliver feed water to the boiler through Gresham's Duplex combined heater and clackbox. The boiler, firebox, dome and cylinders are lagged with J. W. Roberts Limpet asbestos

mattresses with clothing plates of planished steel. The smokebox contains a spark arrester and ash shoot. Inside admission piston valves are actuated by Walschaerts gear and reversing is performed by hand screw. Piston rod packing is of the United Kingdom metallic type. The lubrication of the cylinders is by Wakefield's mechanical lubricator, while syphon lubrication is provided for the axleboxes. The axlebox bearings are of Stone's bronze, lined with Stone's railway white bronze; the coupling and connecting rod bushes are also of Stone's bronze. Axles are of Axlo steel and the driving crank pins of Whitworth compressed steel, oil-hardened. Cowcatchers made in the railway company's works are fitted to the engines.

The axleboxes work in cast steel horn blocks, and spring compensation is arranged in two groups, viz., leading and driving, and trailing and radial axleboxes. The leading four-wheel bogie is of the swing link type with $7\frac{1}{2}$ in. total sideplay; the trailing truck has radial axleboxes with 7 in. play. Collapsible seats with backs are provided for the enginemen.

The vacuum ejector is Vacuum Brake Company's 30/20 combination Dreadnought type with release valve, and is arranged for application on the engine and tender as well as on the train. There is also a hand screw brake on the tender. Sanding to the front of the leading and front of the driving wheels is hand operated. The electric lighting system is Stone's, and fittings comprise head, side, tail and cab lights. The firehole door is of the Ajax type operated by steam with pedal for foot operation of same.

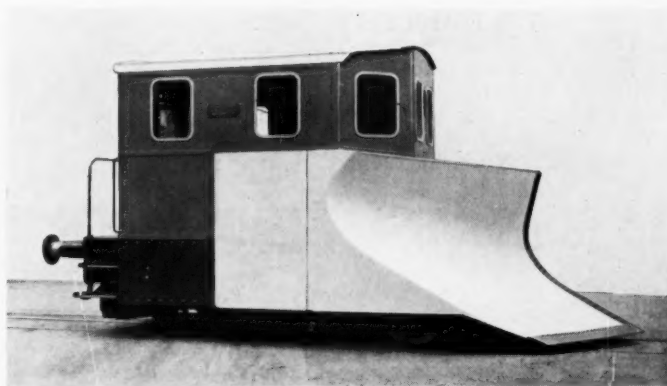
Other fittings include Klinger Reflex water gauges, Hasler speed indicator and recorder, a pyrometer supplied by the Foster Instrument Co., a MeLeSco sand gun and a trigger type regulator. An American type bell is mounted on the boiler, and gong plates in the roof of the cab are worked by train cord. A scum cock is also provided.

SNOW PLOUGHS FOR THE IRANIAN STATE RAILWAYS

For use on the section of line rising to 7,200 ft. above sea level

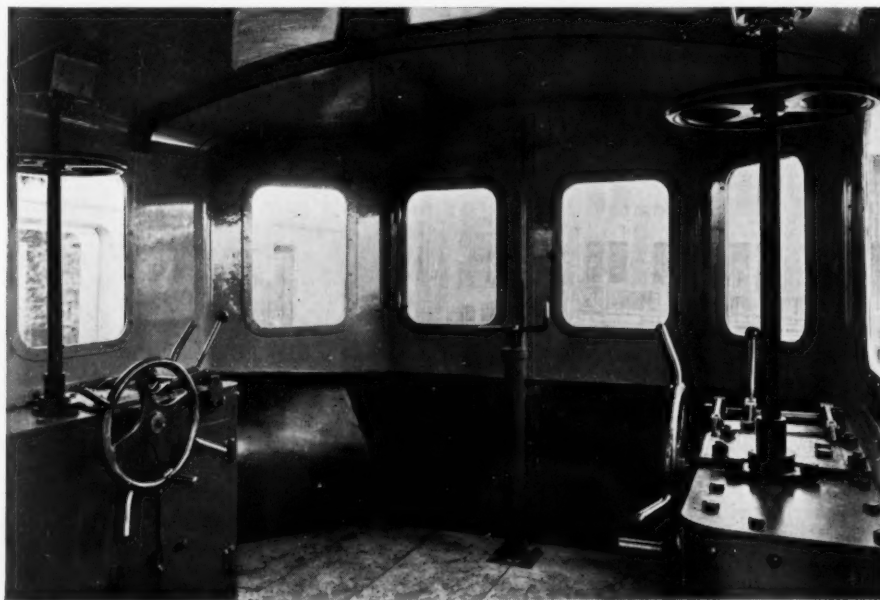
RECENT recollections of the widespread cold weather, of unusual severity and duration, give topical interest to the accompanying illustrations showing one of three snow ploughs designed and manufactured recently by the Swiss Locomotive & Machine Works, Winterthur, to the order of the Iranian State Railways, for use on the Trans-Iranian Railway running from the Persian Gulf, *via* Teheran, to the Caspian Sea. Heavy snow falls are normally experienced on certain sections of this railway, which reaches an altitude of about 7,200 ft. above sea level, and consequently the rapid removal of snow is an important factor in the working of the line.

The snow ploughs are of the wedge action type, and the shape of the plough body plates is such that the snow is first lifted and then thrown sideways. Two lateral wings can be opened separately from the inside of the observation cabin by means of handwheels. The normal width of the snow ploughs is 9 ft. 10 in. and with open wings this width can be increased to 12 ft. 5½ in. The maximum depth of the snow to be handled was specified as 2 m. (6 ft. 7 in.). Handwheels inside the observation cabin are mounted on horizontal axles connected with worm-drive and rack bar mechanism by means of which the lateral wings are operated. If required, this mechanism can be disconnected instantaneously by means of a special device, and the wings can then be manipulated directly by two emergency handwheels on vertical shafts. This provision has been made to allow of instantaneous closing of the wings in case of an obstacle being encountered *en route*.



One of the new snow ploughs for Iran

Behind the rear axle is a small auxiliary snow plough equipped with an ice breaker, the purpose of which is to remove hard or icy snow from between the rails. The height of this small plough can be adjusted by means of a screw handle. A hand brake acting on four brake blocks is provided. The weight of the snow plough, including the ballast (which consists of cast-iron blocks fitted by the Iranian State Railways into specially-arranged compartments), is about 22 tons. The snow plough is pushed by a locomotive and the maximum speed has been fixed at 28 m.p.h. The three vehicles were inspected at Winterthur by Messrs. Robert W. Hunt & Company, Consulting Engineers, London.



Left: Interior of observation cabin, looking forward. The handwheel controls of lateral wings will be noticed

THE RECONSTRUCTION OF KIDWELLY VIADUCT

This structure carries the main South Wales line of the G.W.R. over the River Gwendraeth Fach

ONE of the most important works in bridge reconstruction undertaken by the Engineering Department of the G.W.R. in 1939 was that of Kidwelly viaduct. This structure carries the up and down South Wales main lines over the River Gwendraeth Fach, at a distance of 234 miles 40½ chains from London. The original viaduct, built about 1852, was of timber, but this was replaced in 1894 by the wrought-iron structure which has lately been renewed. The viaduct consists of four spans, each of

timbers, and cross girders supporting the up line. With this portion of the span free, the new centre and outside girders, cross girders, rail bearers, and steel deck-plates were then fixed. These various operations constituted all the work necessary to complete the erection of steelwork for carrying the up line for one span.

Work was first begun on the span nearest Kidwelly station, and on completion of this, the next span was fixed, still for the up line, until the four were finished.



The G.W.R. viaduct over the River Gwendraeth Fach at Kidwelly

68 ft., giving a total length of 272 ft. The sub-structure is made up of two stone abutments and three piers sunk in the river bed. Each of the piers comprises three concrete filled wrought-iron cylinders, 6 ft. dia., set 15 ft. 1½ in. apart, and braced transversely at the top with wrought-iron girders to act as one unit. The super-structure which has been replaced was of the plate girder through bridge type, having one line of centre girders and two lines of outside girders which carried cross girders 4 ft. apart, supporting timber decking on which was laid the ballast and permanent way.

The cylinder piers were found to be in such condition that small repairs only were necessary to put them in good order, and these were carried out by electrically welding patch-plates to the affected parts. The re-use of the piers decided the type of new superstructure, which is similar to the old, except that steel deck-plates riveted to rolled steel beam rail bearers are used, instead of timber decking. The erection scheme, devised in the bridge department of the G.W.R. Chief Engineer's office, in general called for the renewal, first of all, of the half of the viaduct carrying the up line, while keeping the down line open for all traffic.

The first operation necessary was to slew the down line away from the centre girders, in order to make room for cutting away a portion of the timber decking carrying this line, to give access to the cross girder ends, and erect in the space so provided a temporary erection girder alongside an existing centre girder, and, from the former, to carry the ends of the cross girders by means of suspension bolts. The centre girder, relieved of all load by this device, was then removed, also the outside girder, existing

Afterwards, the permanent way of this up line was temporarily relayed and the traffic diverted over it, while the down line was closed for reconstruction. In passing, it should be noted that, before the erection girder could be moved to another span, the weight of the existing cross girders had to be released from it and transferred to the new centre girder. In fixing the steelwork for the down line portion, the erection girder was unnecessary, since there were no cross girders to be held up at this stage of operations. Consequently, the speed of erection was accelerated, and two spans were fixed at one period of occupation, which usually lasted from Saturday midnight to Sunday noon.

The erection girder put to use on this job was originally built for the reconstruction of Saltash viaduct; it had, however, to be lengthened prior to beginning work at Kidwelly. Provision had to be made for supporting the end of the girder from the old structure, and this support comprised 17 in. by 4 in. rolled steel cross channels underneath the floor, hung by flat steel bars from cross head channels resting on top of the existing girders. The heaviest piece to be lifted was the 27-ton erection girder, and two of the G.W.R. Company's cranes, each of 15 tons capacity, were requisitioned for the lifting of this and of all main girders. These cranes occupied the up line during its reconstruction and *vice versa* for the down line, thus keeping, at all times, one line free from these appliances.

Each of the major operations described above had to be worked out in detail to ensure that the cranes could manoeuvre in restricted spaces, and stand in pre-determined positions, without unduly overloading the new and

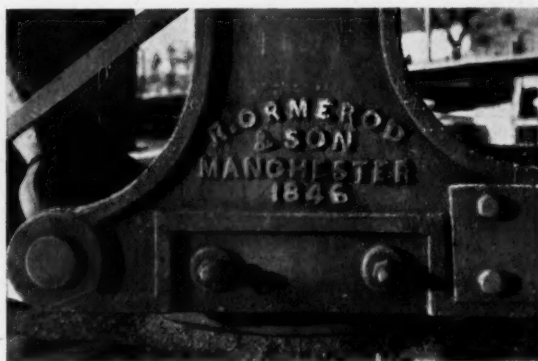
old structures. Also, it was necessary to make an accurate estimate of the time taken for each operation, so that a time schedule could be compiled, acceptable to the Traffic Department, enabling that department to give permission for complete occupation of the lines while the principal and heavy members of the viaduct were lifted into position. Further, the co-operation of the steelwork fabricators was essential, so as to obtain delivery of steelwork at specified times, and in the correct order.

The total weight of new steelwork involved was 390 tons. Orders to begin work were given in December, 1938, and the erection was completed by the end of June, 1939, to be followed by the riveting-up of the whole structure, waterproofing of the decking, and the laying of ballast and permanent way.

For the foregoing particulars, we are indebted to an article by Mr. W. T. Wilks in the *Great Western Railway Magazine*.



Hand-worked 2½-ton travelling crane, built by R. Ormerod & Son, Manchester, in 1846, still functioning at the Copenhagen workshops of the Danish State Railways. It is used for such purposes as lifting boilers for train-heating



Above: Seven new ticket cases specially designed and built for Pier C Wharf ticket office, Vancouver, Canadian Pacific Railway. Three booking clerks have six of the seven ticket cases within their reach

Left: Close-up view of ticket case, showing tickets in their sliding drawers, all visible and within the clerk's reach (See editorial note on page 242)

British Railways and the War—8



Wartime Great Western expresses at Cowley Bridge junction near Exeter. The down train (in foreground) is the combined Cornish Riviera and Torbay Expresses. The Southern Railway main line to Plymouth and North Devon is seen diverging to the left

Photo, "Western Morning News"

[Block courtesy "G.W.R. Magazine"]



The collier's contribution to the war effort is typified in this picture of a large number of trucks of coal in a railway goods yard in London. (See page 268)

Photo]

["The Times"]

RAILWAY NEWS SECTION

PERSONAL

The Secretary of State for Home Affairs has appointed Mr. J. H. Brebner, M.B.E., to be Director of the News Division of the Press & Censorship Bureau.

Sir Andrew Duncan, President of the Board of Trade, has appointed Mr. H. Beer to be his Private Secretary, and Mr. R. B. Tippetts to be his Assistant Private Secretary in succession to Mr. G. E. Preston who has been promoted.

NEW DIRECTOR FOR L.N.E.R.

The L.N.E.R. announces that Mr. Harold Paton Mitchell, M.P., of Tulliallan Castle, Kincardine-on-Forth, has been appointed a Director of the company to fill the vacancy on the board caused by the resignation of Mr. Walter Burgh Gair.

INDIAN RAILWAY STAFF CHANGES

Mr. K. J. McNeill has been appointed to officiate as Deputy Traffic Manager (General), G.I.P.R., as from September 21 last.

Mr. R. C. Case, officer on special duty with the Railway Board, has been granted 2½ months' leave as from November 7 last.

Mr. S. E. L. West, V.D., has been confirmed as Divisional Superintendent, N.W.R., as from August 7 last, but will continue to be employed as officiating Director, Railway Board.

The Hon. H. T. de B. Bingham has been permanently promoted to be Chief Engineer, State Railways, as from October 6 last.

Mr. J. Mackinnon, C.I.E., has been promoted Chief Engineer, State Railways, in a provisionally permanent capacity, as from October 16 last.

Mr. H. M. R. Morse has been appointed to officiate as Deputy Chief Mechanical Engineer, N.W.R., as from October 30 last.

Mr. C. E. Hall has been appointed Deputy Chief Accounts Officer, G.I.P.R., as from November 2 last.

Mr. P. D. Pande has been appointed to officiate as Deputy Chief Accounts Officer, N.W.R., as from November 16 last.

Mr. K. R. Rama Ayyar has been appointed to officiate as Deputy Chief Accounts Officer, E.I.R., as from November 15 last.

On return from leave, Mr. L. Wilson resumed duty as General Manager, G.I.P.R., on December 18 last.

Mr. H. N. Sahgal has been appointed to officiate as Deputy Chief Engineer, E.B.R., as from December 11 last.

Mr. T. J. Hartigan, who as announced in our issue of February 2 has been re-appointed Commissioner for Railways in New South Wales, was born in 1878 and began his railway career in 1893 as a junior clerk in the Accounts branch of the New South Wales Government Railways. He was made Chief of the Bookkeeping Staff in 1911, and Assistant Chief Accountant in 1916. In Septem-



Mr. T. J. Hartigan, C.M.G.

Re-appointed Commissioner for Railways, New South Wales

ber, 1921, he became Chief Accountant, and from March 23 until December 28, 1932, was Transport Commissioner, Finance Branch. Mr. Hartigan was appointed Commissioner for Railways in December, 1932. The term of the Commissioner for Railways, New South Wales, is by virtue of the Transport (Division of Functions) Act, fixed for a period of seven years, but provision is also made that the Commissioner shall be eligible for re-appointment. The Cabinet of the New South Wales Government re-appointed Mr. Hartigan as Commissioner from December, 1939. He received the C.M.G. in June, 1936.

Mr. C. Barker has vacated the office of Registrar of Glyn, Mills & Co.

because of ill health, and Mr. W. A. Gosland has been appointed in his stead.

We regret to announce the death on January 28 of Mr. Donald Munro who was Chief Commercial Representative, Northern Scottish Area, London & North Eastern Railway, at the time of his retirement nearly eight years ago. Mr. Munro entered the service of the Great North of Scotland Railway Company in 1883, and thus was associated with railway service for nearly fifty years.

Sir John Rumney Nicholson, C.M.G., whose death we announced in our issue of December 1 last, has left £56,851 (net personalty £53,321). Sir John Nicholson was Chief Engineer for Docks, London & North Eastern Railway, from 1923 to 1927.

We regret to record the death at Penrith at the age of 92 of Mr. John Ellwood, at one time Goods Manager of the Maryport & Carlisle Railway. Mr. Ellwood retired about 25 years ago.

M. Félix Frédault has been elected President of the board of the Paris-Orleans Railway Company to succeed M. Alfred Mange, who died on January 9 at his home in Paris. M. Frédault had previously been Vice-President and for many years was General Secretary of the company. Since the formation of the French National Railways Company, the board has continued to administer the financial affairs and the real estate of the Paris-Orleans Company. M. Frédault is also a member of the board and of the managing committee of the French National Railways Company. M. Alfred Mange became Managing Director of the Paris-Orleans Railway Company in

1914 and occupied that post until 1927. He was also President of the International Union of Railways.

M. Pineau, Directeur des Carburants at the Ministry of Public Works, has been appointed a member of the board of the French National Railways Company to succeed M. Raoul Dautry, now Minister of Armament.

The visit to this country of Dr. Rüchhan Akinci, Head of the Commercial and Tariffs section, and Mr. Sedat Etker, Chief Mechanical Engineer of the Turkish State Railways, announced on page 157 of THE RAILWAY GAZETTE of February 2, was concluded at the end of last week. The main purpose of the visit

**Dr. Rüchan Akinci, Ph.D.**

Head of the Department of Rates and Commerce,
Turkish Ministry of Communications

**The late Colonel R. E. B. Crompton**

Military and Electrical Engineer,
1845-1940

**Mr. Sedat Etker**

Chief Mechanical Engineer,
Turkish State Railways

was associated with the important contracts for locomotives and wagons, having a total value of approximately £1,000,000, which was signed in Ankara in April, 1939, and is now being executed by the Vulcan Foundry Limited, Beyer Peacock & Co. Ltd., Robert Stephenson & Hawthorns Limited as regards locomotives, and the Metropolitan-Cammell Carriage & Wagon Co. Ltd. and the Birmingham Railway Carriage & Wagon Co. Ltd. for wagons. During their stay in this country the Turkish officials took the opportunity of visiting some of the principal railway works, including Crewe, Derby, Swindon, Doncaster, and York; also various other centres of railway activity connected with the operating departments. Dr. Rüchan Akinci, prior to his present appointment,

was Traffic Specialist and Private Secretary to the Turkish Minister of Communications.

We regret to record the death on February 15 in his 95th year of Colonel Rookes Evelyn Bell Crompton. He was born at Sion Hill, Yorkshire, on May 31, 1845, and has had a distinguished military and engineering career, remarkable alike for its length and diversity. Two branches of his activities which will be remembered chiefly by those engaged in the transport industry are his pioneer work with electric lighting and with mechanical road transport. In 1878 he founded the firm of R. E. Crompton & Co. (afterwards Crompton Parkinson

Limited) of which he acted as Managing Director for about a quarter of a century. He was associated with Sir Joseph Swan in exhibiting at Glasgow the new carbon filament glow-lamp developed by Swan, and Crompton obtained the order to instal these lamps at Queen Street station, Glasgow, among other places. He served in the Crimean war, and in India, and retired from the Army in 1876, but took an active part in the scheme for using trained electrical engineers for national defence, and in 1900 went out to South Africa in command of a contingent of the Corps of Electrical Engineers. For his services on that occasion he was mentioned in dispatches and made C.B. In the war of 1914-19 he was one of those who were engaged on the design

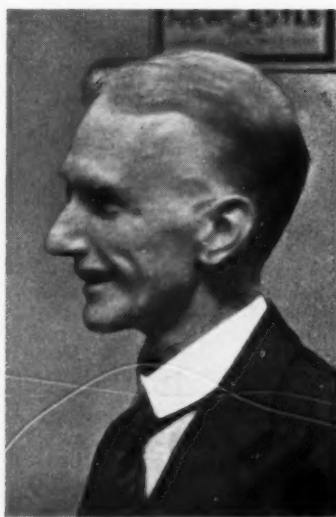


[Photo.]

[Wykeham]

The late Mr. O. F. A. Sandberg, O.B.E.

Partner in Messrs. Sandberg,
Consulting Engineers



"Yorkshire"

[Herald]

The late Mr. P. A. Harverson

Assistant Passenger Manager, North Eastern
Area, L.N.E.R. 1923-40

**Mr. H. J. Green**

Appointed Deputy Chief Engineer
(Civil), L.P.T.B.

of tanks. Colonel Crompton went to India with his regiment in 1864, and shortly afterwards was seconded for special service as Superintendent of the Government Steam Road Train Department, in which capacity he was in charge of the experiments conducted to test the possibilities of road transport on the great trunk roads, as compared with narrow-gauge railways. Many years later, on the formation of the Road Board (in Great Britain) in 1910, he was appointed its Consulting Engineer, and held this position until the Road Board was merged in the Ministry of Transport. Colonel Crompton was twice President of the Institution of Electrical Engineers (1895 and 1908), and once President of the Institution of Automobile Engineers and of the Junior Institution of Engineers.

We regret to record the death on February 15 of Mr. O. F. A. Sandberg, O.B.E., M.Inst.C.E., a Partner in Messrs. Sandberg, the well-known consulting engineers. Mr. Sandberg was born in 1878, and was one of the sons of the late Mr. C. P. Sandberg. He was educated at Dulwich College and University College, London. After two years in the testing Department of Willans & Robinsons Limited, Rugby, and two years with Dick, Kerr & Co., he was taken into partnership with his father, who was then consulting engineer for permanent way to the Canadian, Swedish, Chinese, and Siamese Government Railways. During the war of 1914-1919, acting for his firm, Mr. Sandberg supervised the testing and inspection of over one million tons of railway material for the French Government and other French railways which was being manufactured in the United States of America. From 1916 to 1918 he was Steel Consultant to the Ministry of Munitions for Canada and U.S.A., and was awarded the O.B.E. in recognition of his work. With his brothers, Mr. C. Peter Sandberg, C.B.E., and the late Mr. N. P. P. Sandberg, C.B.E., he developed the well-known processes of Sorbitic treatment of rails and tyres, and the controlled oven-cooling of rails. He was for some years a member of the Sub-Committee of the British Standards Institution. Among those who attended the funeral on February 17 were Sir Herbert Walker and Dr. C. C. Wang.

Mr. Percy Ambrose Harverson, Assistant Passenger Manager, North Eastern Area, London & North Eastern Railway, whose death at the age of 57 we recorded briefly in our issue of February 9, was a graduate of Cambridge University and a wrangler of his year. He entered the service of the North Eastern Railway Company as a traffic apprentice and gained considerable insight into both the operating and commercial departments. In 1909 he took charge of the East Coast section in the General Superintendent's office at York and in 1913 became Local Passenger Agent at Hull. Two years later he took charge of the passenger busi-

ness of the York district and was given the title of District Passenger Manager in 1920. On amalgamation Mr. Harverson was appointed Assistant Passenger Manager, North Eastern area, but continued to supervise the York district also for the next ten years. Since 1935 he gave all his time to the duties of Assistant Passenger Manager and was responsible for some enterprising reforms in passenger arrangements which were of considerable advantage to both the company and the travelling public. He also gave a number of addresses to public bodies in the North Eastern area, which were always clear and enthusiastic statements on behalf of the railway company.

DEPARTMENT OF THE CHIEF ENGINEER (CIVIL), LONDON TRANSPORT

The London Passenger Transport Board announces the following appointments in the Department of the Chief Engineer (Civil), Mr. V. A. M. Robertson:—

Mr. H. J. Green, Assistant Chief Engineer (Civil), is appointed Deputy Chief Engineer (Civil) and will be responsible to the Chief Engineer (Civil) for the work of the building department, permanent way departments, civil engineering drawing offices (except new works), and the construction of the board's Air Raid Precautions work.

Mr. J. H. Condry, Civil Engineer (Maintenance), is appointed Assistant Chief Engineer (Civil) and will be responsible to the Chief Engineer (Civil) as the co-ordinating officer for administrative and staff matters and the estimating and costing work of the department. The co-ordination of the new works programme and questions of ventilation will also be his responsibility.

Mr. J. W. Carswell is appointed an officer of the board with the title of Chief Resident Engineer.

Mr. H. J. Green, a Wiltshireman, received his engineering training in America, where he was employed on the Grand Trunk Pacific Railway as Reconnaissance & Survey Engineer during preliminary work for the route through the Yellowhead pass, Rocky Mountains. Later he was engaged as Construction Engineer on the Mountain Division of that railway. Immediately before the last war he was appointed Survey & Reconnaissance Engineer for the Pacific Great Eastern Railway. He returned to England on the outbreak of war and enlisted in the Royal Fusiliers, and was later commissioned in the Royal Engineers. He was awarded the Military Cross in 1917. After the war he was engaged in harbour and dock construction and later entered the service of the Metropolitan Railway Company as Assistant Engineer. After the death of Mr. E. A. Wilson he was appointed Acting Chief Civil Engineer. On the formation of the London Passenger Transport Board he was appointed Assistant Civil Engineer, and in January, 1938, became Assistant to the Chief Engineer. In February, 1939, he was

appointed Assistant Chief Engineer (Civil). Mr. Green is a Member of the Institution of Civil Engineers, a Member of the Institution of Mechanical Engineers, and a Member of the Institute of Transport.

We regret to record the death on February 19 in his 92nd year of Mr. W. H. Barnden, late Assistant Manager of the London, Brighton & South Coast Railway. Mr. Barnden was educated at Winchester College and entered the service in the Traffic Manager's Office at Brighton in August, 1863; there was no General Manager at that time. He was transferred with the staff to London Bridge in 1869 on the appointment of Mr. John Peake Knight as successor to Mr. George Hawkins, the Traffic Manager; Mr. Knight became General Manager in 1870. Mr. Barnden retired on July 1, 1910.

We regret to record the death on February 5 at the age of 56 of Mr. E. W. Higginson, Claims & Salvage Agent, Great Western Railway. The funeral took place on February 8 at Ealing.

Vickers Limited announce that the Hon. R. H. Vivian Smith has been appointed a Director of the company.

The London Gazette for February 13 contains the following announcement:—
Whitehall, February 12, 1940

The KING has been pleased, by warrant under His Majesty's Royal Sign Manual, bearing date the 3rd instant, to re-appoint John Quirey, Esq., C.B.E., to be a permanent member of the Court styled the Railway Rates Tribunal for a further period expiring on December 31, 1940.

We regret to learn of the recent death, at the age of 77, of Mr. Rudolf Gelpke, the Swiss engineer and former National Councillor, who was the chief promoter of navigation on the upper reach of the Rhine and of the port of Basle.

DIRECTOR-GENERAL OF TRANSPORTATION & MOVEMENTS

The following announcement appeared in the *Supplement to The London Gazette* of Tuesday, February 6 (issued on February 9):—

Col. G. S. Szlumper, C.B.E., T.D., A.M.Inst.C.E., (40493), R.E.(T.A.), to be spec. empld., and is granted the actg. rank of Maj.-Gen. 18th Sept. 1939.

G.W.R. APPOINTMENTS

The following appointments are announced by the company:—

Mr. J. W. J. Webb, Assistant, Chief Accountant's Office, Paddington, to be Assistant to the Chief Accountant, Paddington, from February 19.

Mr. D. H. Hawkeswood, Clerk, Chief Goods Manager's Office, Paddington, to be Assistant District Goods Manager, London, as from January 1 last.

TRANSPORT SERVICES AND THE WAR—26

The work of the Transportation & Movements section of the War Office—Conveying the B.E.F. to France—Coal—Summer time—Flood protection of the London Bridge tube line—Railways in Germany, Italy, and Finland—Air transport

The present war has not resulted in any diminution in the calls made upon the Transportation & Movements section of the War Office activities, notwithstanding the greatly increased degree of mechanisation of the armed forces. It has been found that the tonnage of supplies required for a given number of men approximates very closely in the present war to that of 1914-19; a division in France needs about 500 tons daily, of which about 350 tons is moved to railhead. Sometimes, too, in order to conserve petrol, or for other reasons, the mechanised equipment of the army is itself transported by rail overland, as it must always be moved by ship across the Channel.

Director-General of Transportation & Movements

Of the functions of the department, of which Mr. Gilbert S. Szlumper, formerly General Manager of the Southern Railway, is Director-General, it may be said that "transportation" consists of the provision of the means whereby "movements" may take place and the latter consists of the actual removal of men and materials from place to place. The activities of the department cover transport both at home and in any of the theatres of war. So far as its work at home is concerned, the problems to be dealt with are relatively easy of solution. In most cases all that is required is consultation with representatives of the main-line railway companies as to the best means of achieving a desired end; despite the severe difficulties under which the home railways have laboured because of blackout and other wartime disabilities, it has been found that Governmental demands upon their services have been filled smoothly and well. This is the more credit-worthy since already the lines have lost 35,000 men to the Army, in spite of the care which has been exercised in the recruitment of railway labour. Numbers of

works are being undertaken by the department; 27 of the major undertakings in hand need some 82 miles of railway which will need about 17,000 tons of rails. One of the works alone will require 20 miles of railway to serve it.

In France the problem of transportation becomes much more onerous, and the need for widespread dispersion of stores is much greater than in the last war. Care has to be taken to ensure that a depot is chosen with due regard for all transit facilities, that the port of entry is suitably located in relation to rail facilities and is on a suitable railway for movement to the next destination. The choosing of the location is a matter of considerable skill and is entrusted to those who have experience in it. To the facilities available at the training centre at Longmoor in Hampshire have been added those of the L.M.S.R. School of Transport at Derby, and these have been of great assistance in providing personnel. At Longmoor there are over 4,000 and at Derby 2,000 men in training. In addition, personnel will be augmented with the arrival of contingents from the Dominions and Colonies of men who have had experience in such work as track-laying. Since spike-held flat-bottom track is used in France, these overseas contingents will be especially welcome, for they are well versed in this form of track laying and are more likely to have pioneer experience than railwaymen at home. The train ferries are proving of great value in the transport of a vast mass of heavy equipment to France.

Conveyance of the B.E.F. to France

Military movement in war falls into three categories as follows:—

- Mobilisation, training, and supply movement within the United Kingdom.
- "Long sea voyage" movement, which covers all movement of drafts, units, Dominion contingents, and Colonial troops,



'LINES OF COMMUNICATION'

50,000 miles of railways provide vital links in the chain of National Defence for

PUBLIC SERVICES • ESSENTIAL SUPPLIES
MUNITIONS OF WAR • SERVICE MOVEMENTS

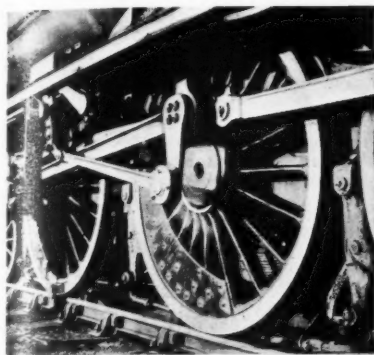
BRITISH RAILWAYS ARE CARRYING ON



THE LMS

HAVE PROVIDED TWENTY-SEVEN
COMPLETE AMBULANCE TRAINS
FOR CIVIL & MILITARY PURPOSES

Three prestige posters conveying impressions of the war effort of the British railways. The first (actually produced by the L.M.S.R.) is issued by the Railway Executive Committee; the second depicts graphically the wartime changeover of the Southern Railway; and the third shows one of the many L.M.S.R. wartime activities



Day in, day out... Night in, night out
BRITISH RAILWAYS operate 20,000
BRITISH built LOCOMOTIVES in
the service of NATION and PUBLIC
BRITISH RAILWAYS ARE CARRYING ON

Another recent prestige poster produced
by the L.M.S.R. for the Railway
Executive Committee



A Railway Executive Committee
plea for indulgence with passenger
and goods train lateness

THE SOUTHERN TO ITS PASSENGERS

SINCE the imposition of the black out, we have seen with regret our much prized punctuality records going by the board

You have borne it patiently with here and there a growl or letter a little more angry than the rest

We want to take this opportunity of saying that we are as fully alive, under war conditions, to the value of punctuality to business people as ever, and there is no detail of our train performance that we do not watch every day and every hour.

We know that it is taking all of you longer to get into the trains and longer to get out. It is taking longer to load and unload parcels, and the train crews are faced with real difficulty in the carrying out of their tasks at stations in the dark. The result is 40, 50 or even 60 seconds per train stop at each suburban station instead of the peacetime 20 seconds. Multiply these by the number of trains run and the number of stations and you get a pile of minutes. These minutes cannot easily be recovered.

But we are hard at it to plan better ways of beating the black-out conditions if it is possible

We think that 99 out of every 100 of our passengers know our record for the last 10 years well enough to trust us not to condemn them to delays and irritations if they can be avoided.

It is still 'SOUTHERN FOR Service', even though it is 'SOUTHERN ON Service'.

The Southern Railway quotes its
peacetime punctuality records, and
explains blackout delays

with their equipment, and all stores traffic from the United Kingdom to the Mediterranean, India, and the Far East, and between the various parts of the Empire.

(c) The movement and maintenance of Expeditionary Forces, with particular reference to France.

The first two categories represent an enormous increase and extension of peacetime movement; the third has no parallel in peace. All are exposed in war to hostile interference, and this exposure to attack reacts at every stage on plans for movement. Except at sea we have not yet been able to learn from experience. We only know that instead of being able to count on an undisturbed base for the development of our war effort as in 1914, we must now regard the United Kingdom as itself a possible theatre of war. In the first days of September, 1939, pre-arranged plans under all three categories of movement came into force. The bulk of the necessary preparatory work was done during the twelve months before the outbreak of war. What this preparatory work involved can best be indicated by an explanation of the principles underlying the plan.

First, the ports on both sides of the Channel were reconnoitred as regards their suitability for the various types of military traffic (personnel, motor transport, ammunition, petrol, supplies, etc.) and the number of berths that could be withdrawn from commercial use. At a few ports facilities were quietly improved. The movement plans were then worked out in close collaboration with the other departments concerned and with the transport organisations. Compared with 1914, the problem was complicated not only by the potential air danger but by the mechanisation of the Army. Every unit was split into two parts. A road party drove the vehicles to a "mechanical transport" port; crossed, though not on the same ship, to the same French port, and then drove them to an assembly area in the interior of France. The second part of the unit, the rail party, travelled light by the shortest route, through a "personnel" port, rejoining its vehicles in the assembly area. In some cases, part or all of the heavy equipment of the unit had to be shipped separately through a third "stores" port.

Some of the other factors which had to be taken into account in framing the movement tables, were the general priority of movement of administrative units and fighting

troops; tactical priority within formations; and proper balance of light and heavy vehicles to ensure suitable loading of ships and locations in England to avoid cross movement. A stores shipment programme was worked out in detail both to maintain the B.E.F. as it arrived in France and to build up reserves as fast as the shipping available and the capacity of the base depots to be established in France would permit. A movement control organisation was created, to be staffed on the outbreak of war almost entirely by reserve officers, N.C.O.s, and clerks drawn straight from civilian life. It was to be the link between the Army on the one hand and the railway, port, and sea transport officers on the other, and would provide a means of centralised and flexible control over all military movement, whatever conditions war might create. Very little training was possible in the time available, but nevertheless this movement-control staff worked extremely efficiently.

When general mobilisation was ordered concurrently with civil evacuation, a still further plan had to be put into operation for the despatch of several thousand reinforcements to defended ports abroad and to Egypt. This was complicated by the necessary inclusion of some three thousand civilians and officers on leave (from India and elsewhere) from all over the country, who could not be allowed to know in advance the port of embarkation. This plan was successfully carried out, and the convoy sailed on September 3. On September 9, the first full convoy of movement control and docks units sailed for France, and from then until October 5 transshipment followed its ordered course. The weather remained fine and no hostile interference was encountered. Apart from one slight accident on September 11, when a train of dock labour collided with a troop train, without causing casualties or serious damage, the railways were able to adhere to their programme. The stores programme also went through well on the whole.

The M.T. (mechanised transport) programme caused more anxiety owing to shipping difficulties. The immediate introduction of the convoy system for all commercial shipping delayed arrivals, so that early convoys often sailed a ship short, while numerous delays occurred through broken tackle or masts, due largely to long disuse of ships' gear for heavy lifts. But through these anxious days, which imposed, of course, minor adjustments in the plan to suit changing con-

ditions, the whole programme for the movement of 158,000 men, 25,000 vehicles, and 140,000 tons of military stores was completed to time without a casualty. As regards provision made for the future expansion of our Army, it is an interesting fact that the actual fighting divisions, with their vehicles, despatched to France last September, represented only one third of the original contingent; the remainder were ancillary services established to cope with the supply and other requirements of the greater army destined to follow the first Expeditionary Force.

Munitions from Coal

Some idea of the nation's resources in raw materials for such essential war requirements as explosives, dyes, drugs, and motor spirit, was given on February 16 to a number of Government officials, British and foreign journalists, and others when, headed by Dr. Leslie Burgin, the Minister of Supply, they visited the Beckton works of the Gas Light & Coke Company, the largest of the kind in the world. The Governor of the company owning the Beckton plant, Sir David Milne-Watson, in his welcoming speech, referred to the tribute paid by the late Lord Moulton, Director-General of Explosives Supplies in the war of 1914-19, who said that "Without the direct aid of the gas industry and further than that, the assistance of and the knowledge which has been acquired by those who have devoted their lives to it, it would have been impossible for this country to have waged the campaigns of the last three years, or even, for any but a trifling time." He went on to say that during the last war one gas undertaking alone supplied enough T.N.T. and other explosives to fill 160 million shells, 17 million gallons of oil, 13,000 tons of disinfectants, and enough tar to treat all the military roads on the Western Front. Since 1918 the productive capacity of the industry had increased by over 50 per cent., and there had been great improvements in technical methods. Between 1914 and 1918 gasworks produced 22 million gallons of benzole; today almost as much could be produced in a single year. Among those present were Mr. R. M. Holland-Martin, Director, Gas Light & Coke Company; Mr. T. A. Smith, Director of Explosives; Professor E. N. de C. Andrade; Mr. E. V. Evans, General Manager of the South Metropolitan Gas Company; Mr. J. Davidson Pratt, Secretary and General Manager of the Association of British Chemical Manufacturers; Dr. H. Hollings, and Mr. W. G. Adam.

The guests were escorted round the works and inspected the working of the gas retorts, the tar distillation plant, the benzole recovery plant, the laboratories, and so on. The greater part of Beckton's coal comes by sea from Durham in the company's own fleet which, at the outbreak of war, consisted of 19 vessels of various capacities up to 4,600 tons deadweight; two of these have been lost since war started. In addition, the company charters a number of colliers. There are two discharging piers, one has eight travelling jib cranes each with a grab capable of carrying 3½ tons at a time. Two vessels can be unloaded at once, and the maximum unloading capacity is 2,000 tons an hour. Actually 2,400,000 tons have been unloaded in one year. The coal is taken by belt conveyors either to store or direct to the coke oven plant as may be required. There is also an export pier from which Beckton's output of coke, pitch, creosote, and other by-products goes all over the world. It is a valuable export trade worth many million pounds a year. The countries mostly concerned with buying these commodities are those of North Europe and the Near East. By carbonisation a ton of coal yields 15,000 cu. ft. of gas, 10 cwt. of saleable coke, 25 lb. of sulphate of ammonia, 4 lb. of sulphur, 3 lb. of toluene (from which many explosive materials are made), 2½ gal. of benzole for use as motor spirit, and 10 gal. of tar.

At the close of the proceedings Captain R. L. Jones, master of the collier ss. *Halo*, which had just arrived out of convoy with a cargo of coal for Beckton, made a short speech in which he outlined what was involved in getting it there. One had not only to dodge mines, he said, but to keep out of the way of the German planes, and to cope with the weather. On his last trip but one, near Whitby, a plane dropped six bombs only 50 yd. astern of him. On

the trip before that he was in the Saturday raid off the Humber. Not all his friends and shipmates had been so lucky. It would, however, take more than Hitler to stop them bringing in the coal, and it was good to know that every cargo of coal they delivered to the piers was another blow at Hitler.

Increased Coal Traffics Moving

The railways are making strenuous efforts to increase the distribution of coal supplies. Special trains are being run night and day, and during the February 10-11 weekend 49,000 loaded wagons of coal were cleared from collieries in the Midlands and the North of England. On Monday, February 12, 40,000 wagons were despatched, on the Tuesday 41,500 wagons, and on Wednesday 44,500 wagons. During the week ended February 15, 255,000 wagons of coal were moved by rail to different parts of the country. These heavy movements of coal traffic are due to the exceptional weather during the first few days of February when reserve stocks were used up and it was impossible to move more than a fraction of the normal supplies. Arrears of coal supplies due to the bad weather have to be transported in addition to the regular weekly tonnages. Sickness due to the long hours worked in the exceptional weather conditions—40 per cent. of the goods guards are away sick at one large centre—and the difficulties of working at sidings and marshalling yards during blackout hours are contributing factors in the problem of getting the coal position back to normal. Coal trains represent some of the heaviest hauls in this country; the average trainload is 600 tons, and supplies of coal for the South of England are made up to 1,000 tons.

Summer Time

In view of the war, summer time is being introduced in many countries of Western Europe next weekend during the night of February 24-25. In Great Britain summer time begins officially at 2 a.m. on Sunday, which is an advancement by nearly two months of the normal Statutory date, which this year would have fallen ordinarily on April 21. Eire has decided to fall into line with Great Britain and Northern Ireland. It has now been officially announced in Paris that, in agreement with the British Government, summer time in France will begin during the night of February 24-25. Actually the hour of the change has been fixed at 2 a.m. on the 25th instead of 11 p.m. on the Saturday night, as heretofore in France. Belgium is introducing summer time during the same night. Germany is to reintroduce summer time this year. This is the result of a decision of the Council for the Defence of the Reich, of which Field-Marshal Göring is President. Summer time in Germany is to begin on April 1 and end on October 6.

On the resumption of summer time on February 25, the time for the collection and acceptance of goods at stations and depots of the British main-line railways will be extended as under:—

Collection	Acceptance
5.0 p.m. (Mondays to Fridays)	5.30 p.m. (Mondays to Fridays)
12.30 p.m. (Saturdays)	1.0 p.m. (Saturdays)

More Visits to Reception Areas

Further railway trips on Sundays at special cheap fares, to enable relatives and friends to visit evacuees in the London reception areas, have been arranged for February 25 and March 3. In connection with the trips run in January, it was found possible to provide special bus services to a large number of villages to which normally there is no Sunday bus service. Intending visitors are advised to notify the voucher-issuing offices of their actual destination and not only their detraining stations, so that arrangements may be made to provide special buses where there is sufficient demand to justify them.

Reading Lights in Trains

The fitting of reading lights in trains has been speeded up, and more than 10,000 compartments a week are now being dealt with. In the seven days ended Friday, February 16, 10,277 compartments were equipped. In all, 106,441 compartments in main-line and suburban trains have so far been fitted with the improved lighting; 108,186 compart-

ments yet remain to be equipped, and, if the present rate of delivery of materials by the manufacturers can be maintained, the railways hope to finish the work by the end of next month.

The London Bridge—Bank Tube

Rapid progress is being made with the installation of flood protection works on the section of the Northern Line tube under the River Thames between London Bridge and Bank stations, which has been closed since September 7. Originally, the under-river section was isolated by the installation of temporary concrete plugs, and it was only at Christmas-time that work was begun on the installation of permanent floodgates, similar to those installed on the under-river sections of the tube in the neighbourhood of Charing Cross (described and illustrated in our issue of October 13, 1939). The actual floodgates are due to be installed by the middle of March and the whole work completed in the early part of May. The present intention is for traffic to be resumed on May 18.

Transport in Germany

The strain which the war and the recent severe weather have imposed on the German railway system was mentioned in a broadcast dialogue from Berlin on February 8, says a Reuters message. The announcer stated: "It is no secret that something is wrong with our coal supply. We have no coal, or at least we have not sufficient coal. I should not like to be a coalman these days." Three speakers explained that there was enough coal in Germany and that the shortage was due to transport difficulties, caused primarily by weather conditions. An official of the Reich Ministry of Transport stated: "The wagons are being loaded to the maximum of their capacity; the time for loading and discharging has been shortened; working hours have been increased; and Sunday labour has been introduced on the railways. Enormous quantities of building material have to be carried to the western wall and to other vital military points. It was not only the mass transport of soldiers to the Western Front in September last which strained Germany's transport system; the pressure has continued despite the end of the Polish war." Herr Walter, head of the Government Office dealing with efficiency in the mining industry, said that there was enough coal in Germany before the war for normal consumption, but consumption had risen in connection with war requirements. The military machine had commandeered civilian labour at the outbreak of war. "We have been left without coalmen, without horses, without trucks," he continued. "All these have been taken by the army and so suddenly that we have been caught unprepared. When the coal trains arrived they could not be unloaded, neither were the following trains able to pass, so that congestion was bound to arise."

The *Münchener Neueste Nachrichten* recently asked the public to have "a large measure of understanding for the difficulties of the Reichsbahn," and repeated the request to refrain from pleasure trips. According to the *Hamburger Fremdenblatt*, it is officially announced that to date 35 out of 59 types of reduced fare have been withdrawn, and since January 15 five special train services (including those arranged for the K.d.F. organisation) have been cancelled.

In the west of Germany, no doubt owing to the proximity to the front, several official establishments of the Reichsbahn have been moved to other quarters.

It is reported from Brussels that foreigners travelling in German trains between Cologne and Aachen are now placed in special coaches of which the windows are totally obscured. There are notices in all compartments informing passengers that anyone breaking the regulations by attempting to look out is liable to be shot on the spot. The corridors are patrolled by members of the Gestapo.

The Italian Railways

It is reported that on February 12 Italy suspended 134 coal-burning steam trains. Presumably this step is related to the difficulty of importing German coal. Much of the seven million tons formerly exported annually from Germany to Italy was conveyed by sea. After the outbreak of war some consignments were diverted to the German railways but Germany is now stated to be unable to keep up regular supplies, as all German wagons are required for internal com-

munication. The supply of foreign coal to Italy during the last four months of 1939 was 10 per cent. below that in the corresponding period in 1938.

Regulations for the organisation of the Italian railways for military transport are contained in a Royal Decree published in Rome on February 15. The Decree, consisting of 40 articles, provides, *inter alia*, for the establishment at general staff headquarters of a permanent mixed technico-military committee to study and prepare the means necessary for carrying out large-scale military transport in case of war.

Finland

Mr. John Langdon-Davies, *Evening Standard* Special Correspondent on the Finnish War Front, has recently given some interesting impressions of wartime travel on railways in the south of Finland. He points out that, as daylight hours are air raid hours, as much business as possible is conducted during the long Northern night. The principal train from Abo to Helsinki leaves at night, and in the corridors stand men in white capes and hoods wearing a yellow armlet, watching lights and prepared for any emergency. When an alarm is signalled down the line warning is promptly given by these corridor wardens and everyone passes along the corridor, climbs down to the track, and scatters into the adjacent woods. In the stillness the aeroplane engines are easily heard but no sound or movement betrays the train or its late occupants. When the "raiders passed" signal is given the passengers climb back into the train which proceeds on its way.

Air Transport

Nearly a ton of British newspapers is now being flown daily to Paris by a new air service for the delivery of newspapers to European countries. For some time there has been a limited newspaper air service *via* France to Belgium, Holland, and Scandinavia. The new and extended service has been arranged for the Ministry of Information by the Civil Aviation Department in conjunction with Imperial Airways Limited. The newspapers arrive in Paris every day in time to catch the principal European expresses to Switzerland, Italy, the Balkans, Turkey, Spain, and Portugal. The new service is an important feature in the distribution of British newspapers all over Europe and is greatly quickening the process.

The Air Minister issued an Order at the beginning of February approving Lympne and Tangmere airports as Customs aerodromes for the use of landplanes. Shortage of aircraft for ordinary civil activities is resulting in curtailment of British air line activity. The long-projected service between England and Lisbon, to connect with the Pan-American Airways transatlantic flights, is still held up through lack of the necessary aeroplane. The British transatlantic services are, however, to be resumed in the spring. The Dutch K.L.M. company is endeavouring to establish an air line between Amsterdam and Lisbon *via* Shoreham, Bordeaux, and Madrid. Difficulties of land transport in Europe have so far reduced the value of the American air line to Lisbon. A French air service between Paris and Lisbon was established on December 16.

Because of aircraft shortage, the Imperial Airways landplane service between England and Alexandria has been reduced in frequency from twice to once weekly. There is still a twice-weekly schedule between Alexandria and Calcutta. The Belgian (Sabena) Air Lines resumed working between Europe (from a new base at Marseilles) and the Belgian Congo on February 11, and, as part of the equipment consists of German Junkers aircraft, it was not easy to ensure its peaceful passage through France from Belgium to Marseilles. The first German aeroplane on the new regular Berlin—Moscow air line arrived in Moscow on January 22. The members of the crew and the staff of the German embassy were entertained that evening by the Chief of the Soviet Civil Aviation. A press message from Istanbul on January 24 said that the Deutsche Luft Hansa air line between Sofia and Istanbul had been suspended through shortage of petrol. At the beginning of February it was announced that a civil air agreement for establishing a Budapest—Sofia—Athens air service had been concluded in Sofia by Hungarian and Bulgarian delegations.

QUESTIONS IN PARLIAMENT

Railway Delays

Captain Frank Medlicott (Norfolk, E.—Nat. Lib.), on February 7, asked the Minister of Transport if he would cause enquiries to be made to ascertain to what extent the recent railway delays were due unavoidably to weather conditions; and to what extent such delays could have been lessened by more adequate emergency arrangements made beforehand.

Captain Euan Wallace wrote in reply: I am satisfied that the exceptionally severe weather conditions were responsible for the delays to which my hon. and gallant friend refers, and that the railway companies took all possible steps to maintain their services in the adverse circumstances.

Overcrowding in Railway Carriages

Captain F. Medlicott (Norfolk, E.—Nat. Lib.), on February 7, asked the Minister of Transport if he was prepared to seek the necessary powers to impose regulations against overcrowding in railway carriages and thus compel the railway companies to provide more adequate travelling accommodation for passengers.

Captain Euan Wallace (Minister of Transport) in a written reply stated: I am not satisfied that regulations restricting the number of passengers who may travel in railway carriages would be in the best interests of the travelling public. Within the limits necessarily imposed by wartime conditions, the railway companies are doing their best to provide adequate accommodation for passengers. If my hon. and gallant friend has in mind any service on which the accommodation provided is alleged to be inadequate and will let me have particulars I shall be pleased to make enquiries.

London Bridge and the Bank Service

Mr. T. E. Naylor (Southwark, S.E.—Lab.), on February 8, asked the Ministry of Transport when the through service between London Bridge and the Bank on the Morden-Edgware line would be available to the public, who had now to alight at London Bridge and proceed by special bus to Moorgate station to continue their journey north.

Captain Euan Wallace in a written reply stated: The line is at present closed in order to enable certain necessary protective works to be carried out. It is hoped that the works will be completed about the middle of May, and the service will be resumed immediately afterwards.

Season Tickets

Mr. R. K. Law (Kingston-upon-Hull, South-west—C.), on February 14, asked the Minister of Transport what compensation was to be allowed by the railway companies to members of the travelling public the value of whose season tickets had been diminished owing to the suspension of railway services since the outbreak of war.

Captain Euan Wallace (Minister of Transport), in a written reply stated: Season tickets are issued on conditions which free the companies from any liability in respect of a reduction in the frequency of services, and I am advised that it would not be feasible to grade the charges for such tickets according to the frequency of the services available.

Reserved Compartments in Trains

Mr. J. J. Tinker (Leigh—Lab.), on February 14, asked the Minister of Transport if he was aware that on occasions certain railway carriages were labelled reserved and were not fully occupied; and would he consult with railway companies to secure that when other parts of the train were overcrowded and seats could not be found, all unoccupied seats should be made available, even though they were in so-called reserved compartments.

Captain Euan Wallace (Minister of Transport): Save in very exceptional circumstances, the reservation of seats

or compartments on railway trains has been discontinued since the outbreak of war. I am not aware of the occasions to which the hon. member refers, but if he will let me have particulars I shall be glad to make enquiries.

Mr. Tinker: I am glad to have had that answer; just at the time when we want equality we find the whole place is packed up. That was why I wanted to draw the attention of the Minister to the matter.

Captain Wallace: Perhaps the hon. member will be good enough to see me after Questions.

Mr. A. Edwards (Middlesbrough East—Lab.): Are compartments reserved from time to time for Government officials?

Captain Wallace: I should like notice of that question.

Mr. W. J. Anstruther-Gray (North Lanark—C.): Will the Minister make sure that sleepers can still be reserved, because it would be inconvenient if too many people were sleeping?

Captain Wallace: My answer was about seats in ordinary railway compartments.

CONTRACTS AND TENDERS

Gammon (Malaya) Limited has received a contract for the Federated Malay States Railways for the construction of a reinforced concrete wharf at Port Swettenham.

The India Stores Department is enquiring about the supply and delivery of buffers for the North Western Railway. Tenders (No. N—970) to be in at New Delhi by March 6. (D.O.T. No. T. 16315/40.)

The Bengal-Nagpur Railway has placed the following orders:—

North British Locomotive Co. Ltd.: Two eccentric sheaves.

Taylor Bros. & Co. Ltd.: 1,100 steel carriage and wagon tyres.

Steel, Peech & Tozer: 990 steel carriage and wagon tyres.

Superheater Co. Ltd.: Superheater elements and headers.

The Mysore State Railway has placed the following orders to the inspection of Messrs. Rendel, Palmer & Tritton:—

Steel, Peech & Tozer: 400 tyres for carriages and wagons, and 54 tyres for locomotives.

Taylor Bros. & Co. Ltd.: 159 tyres for locomotives.

A.B.C. Coupler & Engineering Co. Ltd.: Six buffers for engines and tenders.

Talbot-Stead Tube Co. Ltd.: 450 steel boiler and flue tubes.

Superheater Co. Ltd.: 154 superheater elements.

The Bombay, Baroda & Central India Railway has placed an order with James McIlwraith & Co. Ltd. for 102 chemically dressed wagon covers, to the inspection of Messrs. Rendel, Palmer & Tritton.

The South African Railways have placed the following orders:—

Metropolitan-Cammell Carriage & Wagon Co. Ltd.: 200 bogie drop-sided wagons of the DZ type.

Birmingham Railway Carriage & Wagon Co. Ltd.: 100 bogie drop-sided wagons of the DZ type.

The Egyptian State Railways have placed an order with Taylor Bros. & Co. Ltd. for 100 carriage tyres.

The Madras & Southern Mahratta Railway has placed an order with Taylor Bros. & Co. Ltd. for 100 locomotive tyres.

The Kenya & Uganda Railways & Harbours Administration has placed an order for 300 carriage and wagon tyres with Taylor Bros. & Co. Ltd., to the inspection of the Crown Agents for the Colonies.

The South African Railways are calling for tenders for the following items:—

Bolts, nuts and rivets (Tender No. 2546, April 11; D.O.T. No. T.16085/40).

Grinding wheels (Tender No. 2558, March 14; D.O.T. No. T.16087/40).

Wheels and axles (Tender No. 2544, April 1; D.O.T. No. T.16084/40).

Steel plate (Tender No. 2542, March 26; D.O.T. No. T. 16083/40).

Structural steel for bridgework (Tender No. 2557, April 8; D.O.T. No. T.16086/40).

The New Zealand Public Works Department is enquiring for one 40-ton overhead travelling crane for operation in a substation workshop. (March 5; D.O.T. No. T. 15643/40.)

The India Stores Department is enquiring for labels for railway wagons. Tenders due in London by March 4.

Forthcoming Events

Feb. 23 (Fri.).—Junior Institution of Engineers, 39, Victoria Street, London, S.W.1, 6.30 p.m. "The application of steam propulsion to road vehicles," by Mr. M. Harman Lewis.

Feb. 28 (Wed.).—Institution of Locomotive Engineers, at Savoy Hotel, Strand, London, W.C.2, 6.30 for 7 p.m. Annual dinner.

STAFF AND LABOUR MATTERS

Railway Wages

After the conclusion of the main agreement between the Railway Executive Committee and the three railway trade unions, announced in THE RAILWAY GAZETTE last week, discussions have taken place with representatives of the railway companies and the unions concerning the payment of a war advance to staff not covered by the national agreements, and it is understood that agreement has been reached in regard to the amount of war advance to be paid to certain sections of staff not covered by the national agreements. These include the restaurant car travelling staff, ladies' waiting room attendants, female crossing keepers, and a number of miscellaneous grades whose conditions usually follow those of the conciliation staff.

Railway Electrical Staff

A claim by the trade unions represented on the National Railway Electrical Council for an increase of 10 per cent. in the rates of pay of railway electrical workers has been referred to the Industrial Court for decision.

Railway Shopmen

The National Railway Shopmen's Council on February 15 again considered the claim of the trade unions for an all-round increase of 10s. a week, when it is understood the railway companies made an offer which the trade unions took away to consider.

Shipyards Workers

A conference was held on February 15 between the Shipbuilding Employers Federation and the Confederation of Shipbuilding & Engineering Trade Unions on the claim of the unions for an increase in wages to meet the war conditions. At the close of the conference it was stated on behalf of both parties that it has been agreed to recommend to the constituents of both sides that a war bonus of 5s. a week for 47 hours for male employees 21 years of age and over, whether timeworkers or pieceworkers, be paid as from the beginning of the first full pay week following February 15; and proportionate advances to junior male employees in accordance with existing agreements between the federation and the confederation of the unions. The number of workers affected by the recommendation is more than 100,000.

Road Haulage Wages

Arising out of the claim of the Transport & General Workers Union for an increase in the wages of road haulage workers, the Central Wages Board for the industry agreed to the following increases:—

London area, Grade 1, England and Wales, long-distance services, and parts of Scotland in Grade 1, 5s. a week; Grade 2, 4s.; and Grade 3, 3s.

These increases are for workers aged 21 and over. Others will receive half. Wages will now be stabilised until Sep-

tember 30 next. Subsistence allowance to all workers is increased from 5s. to 6s. a night. The board recommended that the increases should be paid immediately, although there will be a short delay before the new rates are made Statutory. Wages of horse drivers will be dealt with locally.

Industrial Court Awards

The following Industrial Court Awards dealing with Railway Shopmen have recently been issued:—

Award No. 1744. The parties to the issue were the National Union of Railwaymen and the L.N.E.R. The Court had to determine the claims of Fitters G. Fieldsend and J. Spenceley, employed by the L.N.E.R. in the Engineer's Department at Hull, for extra payment under the provisions of Clause II, Schedule F, of Industrial Court Decision No. 728, in respect of work in connection with alterations to a signal bridge at Park Street, Hull, from May 19, 1937, to May 30, 1937, inclusive. The company contended that, having regard to the nature of their ordinary and customary duties—maintenance and repair of plant—the work was not exceptionally dirty and that no extra payment was called for. The Court found that some extra payment falls to be made and referred the question of the amount to the parties for settlement.

Award No. 1745. The parties to the issue were the National Union of Rail-

waymen and the L.N.E.R. The Court had to determine the claim of A. Care, employed by the L.N.E.R. as a grade III machinist in the Mechanical Engineer's Department at Hull Docks, for re-grading as a machinist, Grade II. Care served with the Forces in the 1914-1919 war and as a result of a wound had to have his right arm amputated below the elbow. In 1919 he was re-employed by the company and, in view of his disability, was given employment as a machinist. In October, 1922, when Industrial Court Award No. 728 came into operation, he was graded as a machinist, grade III. The company argued that, on account of his disability, Care was not able to carry out certain classes of work which would be required by a machinist in the higher classes of the work and was, in fact, employed on the simplest form of work. The Court stated that it may be assumed that his qualifications as a fitter are of value in his work as a machinist. However this may be, the Court is of the view that, having regard to the provisions of paragraph 29 of Award No. 728, a machinist suffering from an infirmity which detracts from his efficiency in his employment, as in the present case, cannot be brought within the provisions of Award No. 728 in regard to the grading of machinists, and that in all the circumstances of the case the claimant should be rated as a machinist without any specific grading, at a rate of wages to be agreed upon, having regard to his special qualifications and skill, subject as they are to his infirmity.

Argentine Railways—The Weather and Crops

Argentina has just been going through a heat wave, which, though more lasting than intense, caused much inconvenience to residents of all classes; the death roll from sunstroke in the capital alone amounted to 44. For nearly a fortnight the maximum temperature oscillated between 90° and 100° F., and even at night little relief was obtained, due largely to the fact that in the principal Argentine cities, such as Buenos Aires and Rosario, the heat carries much humidity with it. Fortunately, heavy rains then came to benefit the growing maize crop, which was beginning to show signs of distress.

The inferior yield of the wheat, and to a lesser degree the linseed crop, is now confirmed, and this year's harvest in Argentina can be written down as extremely poor, a very disappointing result after such a heavy wheat crop last year, especially from the point of view of the railways, to which a good wheat crop means so much. Fortunately, the maize crop has benefited from the moisture prevalent in the spring, and given enough rain during the rest of the summer, there might even be a record crop, amounting, it is suggested, to possibly 10,000,000 tons, if the present favourable weather continues. How much of this can be sold abroad, however, depends on the

ability of the buyers to provide the bottoms for shipping it.

Prices of the old crop are dropping, and the growers are already hinting at a minimum price fixation by the Government. But the authorities are hardly likely to repeat their fatal mistake of last year, when, by fixing the minimum price of wheat at seven pesos, they lost over 100,000,000 pesos from the Exchange Profit funds, due to over-production causing the price of wheat in the world markets to slump well below the official figure. Fortunately, Argentina managed to cut its losses when the war broke out, causing a considerable improvement in the wheat quotations.

L.N.E.R. AMBULANCE COMPETITION, 1940.—The eliminating competition for the Scottish area staff in the western district, including teams from Edinburgh, Portobello and Leith, will take place on Tuesday, March 19; the eliminating competition for the staff in the northern, central and southern districts (exclusive of teams from Edinburgh, Portobello and Leith) will take place on March 21. The teams taking the first four places in each of these competitions will qualify for entry into the final competition for the Challenge Cup, which will take place on April 12.

Railway Development in Lithuania

An outline of the expansion of the system and the growth of its equipment and traffic

The main railway system in Lithuania was built up under the Russian regime prior to the 1914-19 war, and was, therefore, of the Russian 5 ft. gauge. But when the country came under German influence after the war, it was converted to the German standard 4 ft. 8½ in. gauge. The Germans also extended the system, though all German work on the lines was executed to a strategic instead of, as formerly, a commercial end. By the Polish annexation of Vilna and the territory round that city in 1920, Lithuania lost some 380 km. of standard-gauge line as well as an important railway centre and workshops; in addition, railway communication between the southern and central districts of the country was severed, and Kaunas, the principal centre, could send goods to Memel, the chief port, only over Latvian or Polish territory.

The situation was met by building new lines to serve these parted districts, and to connect the new capital, Kaunas, with Memel, namely the Kazlu-Ruda—Marijampole—Sestokai line, 58 km., completed in 1924, and the 127-km., Kuziai—Kretinga line in 1932. Even now Kaunas is 325 km. by rail from Memel, though only 200 km. as the crow flies. Meanwhile, communications between Lithuania and Poland had been cut in 1920 and remained suspended until an agreement between the two countries was reached in 1938, since when Kaunas and Vilna have again been linked by rail. As a result, it is estimated that the Kaunas—Vievis section, which has hitherto been a branch line terminating at Vievis on the frontier, will probably carry from five to seven times as much traffic, now that it is part of a through international route, and since the beginning of February a direct passenger service between Berlin and Moscow has been running over it.

On the other trans-frontier line in that neighbourhood, Alytus—Artilerija—Varena, traffic has also been suspended, and it is unlikely to be restored for some time, as the big bridge over the River Niemen, blown up during the last war, will have to be rebuilt.

The New Frontiers

The present position with regard to the frontiers and lines crossing them is clearly shown on the accompanying map. It will be noticed that Soviet Russia has ceded to Lithuania an important strip of country including the main line from Varena through Lentvaris, Vilna, and New Vilna, to Turmantas. The narrow-gauge line cutting across this main line to Kiauneliškiai has been hurriedly restored, forming a useful cross-country connection to Panevezys. Also, another short narrow-gauge line is under construction from Lentvaris to New Trakai, and the section of the main

line between Lentvaris and Kaunas is at present being doubled. Other lines of both standard and narrow gauge have also been built, so that the latest route-distances are 1,215 km. (755 miles) of standard gauge and 473 km. (294 miles) of 0·60 m. and 0·75 m. gauges, together.

International Through Services

Arrangements have been made to establish through communication with Russia *via* (a) New Vilna and Molodeczno; (b) Vilna and Lida; and (c) Vilna, Varena, Grodno, and Warsaw. For the moment it is proposed to run through passenger services only *via* Molodeczno, and, owing to the break of gauge, there will be a change of trains at the frontier between Kena and Gudagojis. The opening of this route will save about 100 km. on the through journey from Berlin to Moscow, as compared with the other routes *via* Daugavpils (Dvinsk).

From the map it will be noticed that Germany has acquired the so-called Suvalki triangle (shown shaded) and that the new German-Soviet frontier runs from the southern tip of Lithuania to near Reuss.

Rolling Stock and Workshops

As gauge conversion was proceeding after the last war, rolling stock was borrowed and later purchased from Germany and, to a less degree, other countries. This continued until 1936, when Lithuanian shops began to build both locomotives and rolling stock. Before 1924 all repairs also had to be carried out in Germany, as the only workshops in Lithuania were those at

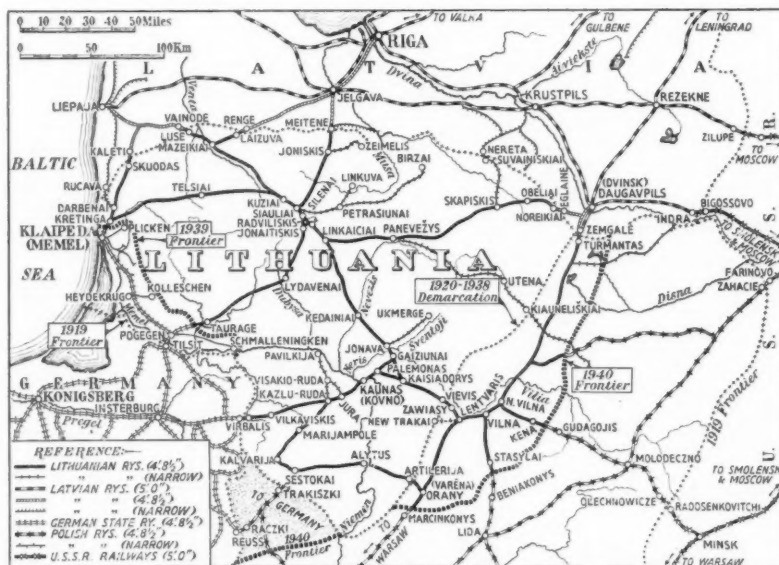
Kaunas for wagon repairs, and the plant had been removed from them and from the country during the war. By 1926, however, even heavy repairs were being undertaken in the reorganised shops. The latest figures available show that Lithuania now possesses the following:—

	Standard gauge	0·60 and 0·75 m. gauges
Locomotives ..	153	52
Railcars ..	8	4
Shunting tractors	7	—
Carriages ..	313	76
Wagons ..	3,931	519

Recently 6 additional large 4·6·2 express engines have been acquired from the Skoda works of Pilsen. During 1938-39 over 1,900 wagons were equipped with automatic air brakes. The workshops have lately been supplied with all kinds of modern equipment, including an electric steel foundry, a laboratory for analysing and testing materials, and locomotive and railcar testing apparatus. Electric power houses have been built and brought into use at six important centres, some of them supplying current to the towns in which they are situated; at 45 other stations current is taken from local sources of supply.

Passenger Traffic

Passenger traffic on the standard-gauge lines has steadily increased during the past 20 years, latterly by about 500,000-600,000 passengers year. In 1919 only 220,000 were carried, whereas in 1938 the figure was 3,886,700. On the other hand, the narrow-gauge lines have not been so fortunate since 1934, though prior to that year their passengers had risen from 157,000 in 1920 to over 2,000,000. In 1935 1,370,600 were carried, but in each of



Sketch map of the railways of Lithuania. The new frontiers with Germany and Soviet Russia are indicated

the years 1936-7-8 the figures were only from 250,000 to 318,000 the catastrophic fall between 1934-36 probably being due to road completion.

Finances and General Conditions

The latest available returns show that in 1936 standard gauge receipts totalled 31,372,768 litas, and expenditure was 24,241,519 litas, giving an operating ratio of 77.3 per cent. But

the narrow-gauge receipts were only 2,082,290 litas and expenditure was 2,828,499 litas, an operating loss of 746,159 litas and an operating ratio of 135.8 per cent.

At present a new line is under construction between Lentvaris and New Trakai, as mentioned above.

It must be remembered that all the improvements and extensions mentioned above have been carried out

despite the comparative poverty of the country. It is the latter fact that is mainly responsible for the condition of the permanent way being none too good even today, and for the fact that the maximum statutory speed limit is only about 32 m.p.h. This defect and the roundabout routes have made the Lithuanian railways particularly susceptible to competition from road competition.

MINISTRY OF TRANSPORT ACCIDENT REPORT

Hindley, L.M.S.R., October 31, 1939

Mr. J. L. M. Moore was the inspecting officer who inquired into the accident, which occurred at 5 a.m. on October 31, 1939, at Hindley, L.M.S.R., when the Horwich works fire brigade train, propelled by a 2-4-2 tank engine, bunker leading, and composed of a tank wagon, a pump wagon, and a brake and equipment van containing the brigade staff, ran into the buffer stops of the over-run track at the end of the up loop line, which runs between Hindley No. 2 and No. 1 signal boxes. The train was fitted with the automatic vacuum brake; it must have been travelling at considerably more than the 15 m.p.h. estimated by the driver, J. Young; the equipment van demolished the buffer stops and struck the abutment of a bridge, 11 yd. beyond, and its main frame was over-ridden by the pump wagon. The steel-work of the buffer stops trapped the brigade captain, R. Harrison, who was fatally injured. Four other members of the brigade were seriously injured, and the remainder suffered minor injuries. The weather was fine but it was very dark. Driver Young admitted that he mistook the line he was travelling on and acted on a signal cleared for a train on an adjoining track.

The train had been to a fire at Ince Moss refuse dump and was going from De Trafford junction towards Hindley No. 2 box, where Young asserted he saw the loop-entering signal cleared for him. He saw the outlet signal was at danger and was prepared to stop, but kept the regulator open as he was on a sharp rising gradient. He also noticed that the signal for the adjacent loop line, almost opposite the loop outlet signal, had been cleared and at that time was under no misapprehension about which line he was on. Proceeding along the loop the front of the train obscured the red light of the outlet signal and he formed the erroneous opinion that he was on the track to which the green signal, which he could see, applied. He allowed the train to run under steam until within 20 yd. of the signal, when, on seeing a red hand-signal, he made an emergency brake application, but it had little time to take effect.

Inspecting Officer's Conclusions

Mr. Moore accepts Young's statement that he took the Hindley No. 1

up slow home signal to apply to him and believed himself to be on that line, but does not accept his other statement that he thought he was entering the loop. He entered the loop at such a speed that Signalman Partington, Hindley No. 2 box, telephoned ahead, resulting in the red hand signal being exhibited from the No. 1 box. Young did not stop his fireman from firing, a natural course to take if he was expecting to be stopped within 500 yd. He had worked the fire brigade train from Ince Moss to Horwich only once before, when it was turned along the up slow line at No. 2 box; he probably misread the bracket signal in rear of the loop facing points. Responsibility rests upon him. He is 49, with a good record, and has been driving in the district for nearly 14 years.

Mr. Moore considers that the black-out contributed to the accident; in the usual light from the No. 1 box, Young would probably have seen that there were two tracks between his train and the box and realised that he was on the loop. It is unfortunate that the fireman was not conversant with the signals and that Young apparently did not receive any assistance from

Harrison. Promoted brigade captain in October, 1923, Harrison was passed for guard's duties, but being in the Chief Mechanical Engineer's department, he was not subject to yearly examinations, nor called on to sign route cards indicating sections of line with which he was conversant. The extensive area covered by the Horwich brigade includes remote points such as Carlisle, Bradford, Leeds, and Goole; it would have been impossible for Harrison to have been conversant with all the intervening routes. Had there been a guard at the leading end of the train, acquainted with the locality, the accident in all probability would have been avoided.

Recommendation

The propelling of fire brigade trains appears to be inevitable, on occasions, to meet the exigencies of the service. There is, however, no authority for it, and while there is no reason to suggest that the practice is being abused, it should be restricted as far as possible. In addition, instructions should be issued to ensure, in the event of a train being propelled, a constant look-out being maintained from the leading end, by a man conversant with the route being traversed. Means should also be provided whereby he can give audible warning of approach to anyone on the line.

Problem of Panel Operation

In an interesting article in the *Revue Générale des Chemins de fer* for December, 1939, Monsieur Épinay, in describing the electric operation of some outlying relief line facing points on the Étampes-Orleans line of the S.N.C.F., discusses the relative merits of having locks on the operating handles or leaving them free and relying on the relay interlocking system to prevent irregular movements of lineside functions. The points referred to have been equipped on the latter plan, with a sort of panel frame in the nearest station. One disadvantage is that although the turning of a handle at the wrong time, with a track section occupied, is productive of no result, should there be vehicles in the train giving a bad shunt there is the possibility of the points starting to move should the shunt go off altogether, with serious results. The apparatus has therefore been arranged so that the setting in action of the point controls by the handle only lasts for an instant; if the shunt then fails to hold the points will not move, even if the handle is still

reversed. When the line becomes clear the handle must first be restored to agree with the position of the points and again turned, in order to shift them. Turning a handle at a wrong time starts an audible alarm signal. The possibility of a handle being moved at the precise instant when a shunt fails is regarded as so remote as to be neglected. It is stated that a route setting signal box at Montauban is to have its controls arranged on this principle. To allow of a route being changed, the approach locking can be cancelled by the guard, who, after telephoning, operates a cancelling switch or button, electrically interlocked with the signal aspects.

MORE COAL TRAINS: FEWER PASSENGER TRAINS.—The Minister of Transport announced in the House of Commons on Wednesday that 143 additional coal trains a week are to be run, to relieve domestic coal shortage in the South. Over 100 will run on the L.N.E.R. This will involve certain passenger-train suspensions from Monday next.

NOTES AND NEWS

B.A.G.S. Wins a Lawsuit.—The *South American Journal* reports that a verdict was given on December 29, in a lawsuit in which the Federal judge orders the payment by the Government to the Buenos Ayres Great Southern Railway of the sum of \$1,685,714, plus interest accrued in the past 42 years. The lawsuit relates to the claim of the company, as successor of the Buenos Ayres & Ensenada Railway, for damages for the removal, by order of the Government, of the branch line between the central station and Casa Amarilla in 1897.

Exhibition of Travel Posters.—An exhibition of travel posters by the well-known artist Mr. Gregory Brown was opened on Tuesday at the Whitechapel Art Gallery, E.1. This exhibition represents a selection of the work done by the artist over the last 27 years; most of the posters on view were produced for the L.N.E.R., G.W.R., London Transport, and the Southern Railway. Many of Mr. Gregory Brown's striking and tasteful designs will be familiar to our readers, quite a number having received notice in our columns. The exhibition will remain open from 10 a.m. to 6 p.m. (Sundays, 2 p.m. to 6 p.m.) until March 23. Admission is free. The Whitechapel Art Gallery is adjacent to Aldgate East station.

Road Accidents in January.—The return of the numbers of persons reported to have died in Great Britain during January as the result of road accidents, shows a total of 619. This compares with 485 in January, 1939, and with 1,155 in December last. Adult pedestrians suffered most; the number killed was 406 last month compared with 233 a year before. Of these 371 deaths occurred as the result of accidents upon roads subject to a speed limit. There were 30 deaths among motor-cyclists compared with 27 in January, 1939. The severe weather conditions prevailing in January in many districts may have brought about a large reduction in the number of per-

sons and vehicles using the roads, states the Ministry of Transport, and this should be borne in mind in making comparison with the greater number of deaths in December, 1939.

A New Soviet Line.—It is reported that the first train was worked over the new 500-mile Abmolinsk—Kartaly line, in Western Siberia, at the end of January. According to present intentions, this line will form part of a main line connecting the Magnitogorsk area of the Urals with the Turksib Railway.

Iraqi State Railway Contract Progress.—Mr. George Balfour, Chairman of the Power Securities Corporation, at the annual meeting on February 14, said that the work on the contract for the Iraqi State Railways was nearly finished. The tracks, together with station and other facilities, should be finished in a few months; the railway would then be ready for service and a through line established from London to Baghdad and Basra with only two short breaks—the Channel crossing and the ferry from Istanbul to Haidar Pacha.

Argentine Railway Earnings.—The gross receipts of the Argentine railways for the first three months (July-September) of the financial year 1939-40, amounted to 123,706,000 pesos m/n., or 7,637,000 pesos (6.6 per cent.) more than in the corresponding period of the previous financial year. The British-owned railways accounted for 84,615,000 pesos of the total, an increase of 5,071,000 pesos, or 6.4 per cent. The increase was wholly in goods traffic, receipts from which, for the whole system, totalled 91,229,000 pesos, or 9.7 per cent., more than the 1938-39 figures, passenger receipts, at 21,133,000 pesos, being 2.3 per cent. less. Goods tonnage was 12,412,000, or 11.8 per cent. greater, while the number of passengers fell to 41,250,000, a decrease of 2 per cent. Of the aggregate earnings the British-owned lines accounted for 68.4 per cent., other privately-owned railways for 8.5 per cent., and the State railways for 23.1 per cent.

British and Irish Railway Stocks and Shares

Stocks	Highest 1939	Lowest 1939	Prices	
			Feb. 20, 1940	Rise/ Fall
G.W.R.				
Cons. Ord.	38	21½	48*	—
5% Con. Prefce. . . .	92	71	100½*	—
5% Red. Pref. (1950) .	98	83	100½*	—
4% Deb.	103	91	105½	—
4½% Deb.	105½	93½	107½	—
4½% Deb.	110	99	112	+1
5% Deb.	121	109½ ¹⁶	123½	—
2½% Deb.	63½	54	65½	+1
5% Rt. Charge	117	104	116	—
5% Cons. Guar.	111	96½ ¹⁶	113*	—2
L.M.S.R.				
Ord.	17	9½	22	+1
4% Prefce. (1923) . . .	46½	20	57½	—1
4% Prefce.	63½	37½	67½	—2
5% Red. Pref. (1955) .	83	58½	90	—
4% Deb.	98½	85	96½	—2
5% Red. Deb. (1952) .	109	101½	107	—
4% Guar.	87½	73	92½	—
L.N.E.R.				
5% Pref. Ord.	5½	3½	7½	—½
Def. Ord.	3½	1½	3½	—½
4% First Prefce. . . .	38½	19	56½	—
4% Second Prefce. . .	15	7½	20½	—
5% Red. Pref. (1955) .	55	38	77½	—
4% First Guar.	78½	60	84½	—
4% Second Guar. . . .	68½	47	74½	—1
3% Deb.	71½ ¹⁶	57	71½	—
4% Deb.	93	76	94½	—
5% Red. Deb. (1947) .	106½ ¹⁶	98	105½	—
4½% Sinking Fund Red. Deb.	104½	96	102½	—
SOUTHERN				
Pref. Ord.	78	46½	78	+1
Def. Ord.	19½	7	20	+½
5% Pref.	100	76	102½	—
5% Red. Pref. (1964) .	102½ ¹⁶	94	101½	—
5% Guar. Prefce. . . .	116½	103	115	—
5% Red. Guar. Pref. (1957)	112½	102½ ¹⁶	112½	—
4% Deb.	103	91½	104½	—1
5% Deb.	118½	109½	123½	—
4% Red. Deb.	106	98	105½	—
1962-67				
4% Red. Deb.	102	96	105½	—
1970-80				
BELFAST & C.D.				
Ord.	6	3	4	—
FORTH BRIDGE				
4% Deb.	98½ ¹⁶	81	90½	—
4% Guar.	95	80	90½	—
G. NORTHERN (IRELAND)				
Ord.	6	2½	4½	—
G. SOUTHERN (IRELAND)				
Ord.	13½	8	11½	+1½
Prefce.	26	10	22	—
Guar.	40½	22	34	—
Deb.	57	45½	53	—
L.P.T.B.				
4½% "A"	115	103	114½	—
5% "A"	123	106½	120½	+1
4½% "T.F.A."	105	100½ ¹⁶	103	—
5% "B"	117½	102	113½	—2
"C"	84	63½	65	—
MERSEY				
Ord.	24½ ¹⁶	17½	21½	—
4% Perp. Deb.	93½	88½	91	—
3% Perp. Deb.	77	65½	64½	—
3% Perp. Prefce. . . .	55	49½	52½	—

* ex dividend

Irish Traffic Returns

IRELAND		Totals for 6th Week			Totals to Date		
		1940	1939	Inc. or Dec.	1940	1939	Inc. or Dec.
		£	£	£	£	£	£
Belfast & C.D. (80 miles)	pass.	1,827	1,577	+	11,998	9,879	+
	goods	409	417	—	2,854	2,263	+
	total	2,236	1,994	+	14,852	12,142	+
Great Northern (543 miles)	pass.	8,450	7,850	+	54,050	47,450	+
	goods	10,150	10,150	—	63,500	54,950	+
	total	18,600	18,000	+	117,550	102,400	+
Great Southern (2,076 miles)	pass.	27,240	27,983	—	171,117	167,173	+
	goods	41,788	40,310	+	247,989	239,867	+
	total	69,028	68,293	+	419,106	407,040	+
L.M.S.R. (N.C.C.) (271 miles)	pass.	3,610	3,000	+	21,520	17,910	+
	goods	3,380	2,830	+	17,610	15,300	+
	total	6,990	5,830	+	39,130	33,210	+

RAILWAY AND OTHER REPORTS

London Passenger Transport Board.—The London Passenger Transport Board announces that, having regard to the provisions in paragraph 8 of the White Paper (Cmd. 6168) outlining the financial arrangements for the control of the board's undertaking, it proposes to make a payment on account of interest on London Transport "C" stock for the financial year ending on June 30, 1940, which will be made by the board's registrar, the Bank of England, on March 27, 1940, to all holders of London Transport "C" stock whose names are registered or inscribed in the books of the Bank of England at the close of business on February 28, 1940, such a payment to be at the rate of $1\frac{1}{2}$ per cent. less income tax at 7s. in the £.

Coventry Canal Company.—The directors recommend a final dividend of 3 per cent. making 6 per cent. for the year 1939, the same as for the previous year.

Oxford Canal Company.—The directors recommend a final dividend of 5 per cent., making 8 per cent. for the year 1939, the same as for 1938. Net profit is announced of £7,661, which compares with £8,881.

Rochdale Canal Company.—Net revenue for the year 1939 was £13,818 which compares with £14,784 for 1938. The directors recommend a final dividend of $1\frac{1}{2}$ per cent. on the ordinary shares, making 2½ per cent. for the year, the same as for the previous period.

Isle of Man Steam Packet Co. Ltd.—The directors announce that net profit for the year 1939 was £37,776 which compares with £36,901 for the previous year. Income from traffic, requisitions, and sundries was £555,312 against £512,229, and operating expenses, etc., were £390,230 against £346,376. Profit has been struck after making provision for depreciation and towards replacement special repair and reconditioning of ships (£80,000) and also for contingencies and taxation. The company holds 25,000 £1 shares of Isle of Man Air Services Limited. A dividend is recommended of 6 per cent. (same).

Rangoon Port Commission.—The report for the year ended March 31, 1939, shows an excess of income over expenditure of Rs. 1,48,033, a considerable improvement on the estimated figures for the year. Actual receipts were slightly lower, at Rs. 69,76,000, compared with Rs. 70,96,781, in 1937-38, but an even greater reduction had been effected in the expenditure, which amounted to Rs. 65,77,967, against Rs. 67,57,224. The contribution to capital account of Rs. 2,50,000 brought the total expenditure up to Rs. 68,27,967. The total net tonnage of steamers entering the port was 4,311,002, an increase of 200,531 tons over that of the previous year.

International Railways of Central America.—The company is paying \$2 a share off arrears of dividend on the preferred stock; this will leave the arrears outstanding at \$24.75 a share.

Canadian Pacific Railway.—The directors announce that, while operations for 1939 have resulted in a substantial improvement, the uncertainties of the present situation are such that they would not be warranted in declaring any dividend on the preference stock.

Oldham, Ashton-under-Lyne & Guide Bridge Junction Railway Company.—The directors recommend a final dividend of 2½ per cent., making 4½ per cent., the same as for the previous year. The accounts show that for the year 1939, after allowing for estimated settlement in respect of the period of Government control, there was a net revenue debit of £3,762 (against a debit of £2,348). The amount receivable from the L.N.E.R. and L.M.S.R. under the terms of the lease is £5,662 against £4,248.

Manchester Ship Canal Company.—The directors recommend the following dividends: 3½ per cent. on the Manchester Ship Canal Corporation preference stock, 3 per cent. (against 2 per cent.) on the preference shares, and 1½ per cent. (against 1 per cent.) on the ordinary shares. Net revenue for 1939, after deducting interest and fixed charges, and provision for taxation and reserves, is £215,007 (against £144,834). Tolls, ship dues, and miscellaneous receipts were £1,465,600 (against £1,377,200).

Pennsylvania Railroad.—The company announces that gross operating revenues in 1939 were \$430,930,778, an increase of \$70,546,537, or 19.6 per cent. over the previous year; and operating expenses were \$306,900,835, an advance of \$49,853,592, or 19.4 per cent. The net railway operating income for the year was \$77,304,330, an increase of \$19,971,432 or 34.8 per cent. over 1938. Freight revenues during 1939 increased \$61,702,742, or 23.8 per cent. and passenger revenues \$5,310,627, or 8.1 per cent.

Provincial Railways of Buenos Aires.—Gross receipts of the Compagnie Générale de Chemins de fer dans la Province de Buenos Aires, for the year ended June 30, 1939, amounted to \$11,449,515 in Argentine currency, compared with \$11,808,964 in 1937-38. Working expenses were reduced from \$11,652,807 to \$10,933,075, leaving net receipts of \$516,439. In French money, after adding sundry credits, including interest and exchange gains, and meeting all charges, there was a profit of fr. 877,485, which was appropriated to reserve funds. Passengers numbered 2,281,328, for receipts of \$1,130,538, and

goods traffic amounted to 1,382,135 tons with receipts of \$9,324,303. The ratio of working was 95.49 per cent.

Bristol Tramways & Carriage Co. Ltd.—The directors recommend a final dividend of 4 per cent., making 8 per cent. tax free for the year 1939; this compares with 10 per cent. less tax for 1938.

Lightalloys Limited.—The directors recommend an interim dividend of 12½ per cent. which compares with 15 per cent.

Illinois Car & Equipment Company.—Announcement is made of a further distribution under the dissolution of the company, of 10 cents (6d.) a share, payable March 30, from funds now available for this purpose.

Hoffmann Manufacturing Co. Ltd.—The directors report net profits for the year 1939 of £264,243 (against £234,930), and recommend a final ordinary dividend of 10 per cent., free of tax, making 17½ per cent., free of tax (same).

Davies & Metcalfe Limited.—The directors recommend a final dividend of 6 per cent. (which compares with 10 per cent.) making 10 per cent. for the year 1939, against 15 per cent. for 1938. Net profit is returned at £14,328 (against £25,789).

Vickers Limited.—At a meeting of the board held on February 15, the undermentioned final dividends were declared: 2½ per cent. actual, less income tax, on the preferred 5 per cent. stock; 2½ per cent. actual, less income tax, on the 5 per cent. preference stock; 2½ per cent. actual, free of income tax up to 6s. in the £ on the cumulative preference stock; making in every case 5 per cent. for the year ended December 31, 1939. Payment will be made on March 21, 1940.

Forthcoming Meetings

Feb. 26 (Mon.)—**Manchester Ship Canal Company** (Ordinary general) Milton Hall, Deansgate, Manchester, at 11.30 a.m.

Feb. 27 (Tues.)—**Whitechapel & Bow Railway Company** (Ordinary general), 55, Broadway, Westminster, S.W.1, at 2.45 p.m.

Feb. 28 (Wed.)—**Great Northern Railway Company (Ireland)** (Ordinary general) Grosvenor Minor Hall, Belfast, at noon.

Feb. 28 (Wed.)—**Great Western Railway Company** (Annual general), Paddington station, at 11.30 a.m.

Feb. 29 (Thurs.)—**Forth Bridge Railway Company** (Statutory general), Marylebone station, at 10 a.m.

Feb. 29 (Thurs.)—**Liverpool Overhead Railway Company** (Ordinary general), India Buildings, Water Street, Liverpool, at noon.

Mar. 1 (Fri.)—**Great Southern Railways Company (Eire)** (Ordinary general), Gresham Hotel, Dublin, at 2 p.m.

Railway Share Market

Following the Government's decision to commence arrangements for mobilisation of American dollar securities, firm conditions have developed in most sections of the Stock Exchange. Sentiment is being assisted by the belief that eventually the proceeds of requisitioned American stocks will be reinvested in a wide range of securities, although it is realised that by far the largest proportion is likely to be placed in British Government Funds. The prevailing view is that the Defence Loan will probably make its appearance before the Budget statement in April. The home railway market has been active, although less buoyant than last week, and on balance slightly lower prices have been made. Profit-taking sales were more in evidence, but buyers were attracted by any easing in quotations. Owing to the abridged form in which the accounts are now published, the annual meetings are being awaited with especial interest for any additional indications as to the position and outlook.

Great Western ordinary was slightly easier at 47½ xd., which compares with 48½ a week ago, and the guaranteed stock, which is also xd., was 1½ points down at 114. A decline from 103 to 100½

was shown by the preference stock, and the 4 per cent. debentures had a "middle" price of 105. Southern preferred attracted attention in view of the generous yield, and at 77½ was fractionally higher on the week, while the deferred had further improved from 19½ to 20½. Moreover, the guaranteed stock was maintained at 115½; the preference stock was easier at 102, and the debentures were around 104. Buying of L.M.S.R. ordinary has been in evidence in response to the market view that this stock appears relatively undervalued, and the price improved from 21½ to 22½. A small reaction from 58½ to 57 was shown by the 4 per cent. 1923 preference, which yields fully 7 per cent. and the present price carries the whole of the distribution for the past year. The 4 per cent. senior preference, which was 69 a week ago, has since eased to 67½, and the guaranteed stock was fractionally lower at 92. Whereas L.M.S.R. 4 per cent. debentures were lower at 96½, the 5 per cent. debentures continued to be quoted at 107. Yields of around 4 per cent. obtainable on home railway debenture stocks are attractive when compared with the return on other first-class investment securities. L.N.E.R. 4 per cent. debentures lost a point to 94, and the 3 per cent. debentures were 71, compared with

71½ a week ago. L.N.E.R. second preference continued in demand, and was slightly higher at 21, but the first preference reacted a point to 56. Whereas the first guaranteed was slightly higher at 84½, the second guaranteed, the yield on which would seem to be unduly generous, has gone back from 75½ to 74. Both the deferred ordinary and preferred stocks were active, but last week's gains were not fully held, the former now being 3½ and the latter 7½. London Transport "A" and "B" stocks were firm. It is expected the "C" stock will be unpegged from its minimum price of 65 following the impending dividend statement, which will be made by the time these notes are read.

Argentine and other foreign railway securities have developed a firmer undertone; sentiment has been assisted by the better tendency in Argentine Government bonds. B.A. Gt. Southern 4 per cent. debentures were slightly higher at 63, as were B.A. Western 4 per cent. debentures at 59½. B.A. & Pacific 4 per cent. debentures held last week's improvement to 66½, and the 4½ per cent. debentures were again 36½. Canadian Pacific shares were firmer, and the preference stock at 35½ was fractionally better than a week ago. Grand Trunk 4 per cent. guaranteed debentures were higher at 102.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1939-40	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffic to Date			Shares or Stock	Prices						
			Total this year	Inc. or Dec. compared with 1939		Totals		Increase or Decrease		Highest 1939	Lowest 1939	Feb. 20, 1940	Yield % (Note)			
						This Year	Last Year									
South & Central America	Antofagasta (Chili) & Bolivia	834	11.2.40	£ 11,520	—	£ 160	6	£ 105,970	£ 74,520	+	£ 31,450	Ord. Stk.	105½	41½	10	Nil
	Argentine North Eastern ..	753	10.2.40	ps. 114,500	—	ps. 16,100	33	ps. 5,001,900	ps. 5,183,300	—	ps. 181,400	6 p.c. Deb.	41½	2	21½	Nil
	Bolivar ..	174	Jan. 1940	3,700	+	300	4	3,700	3,400	+	300	Bonds	71½	53½	7	Nil
	Brazil ..	2,801	10.2.40	ps. 1,780,000	—	ps. 20,000	33	ps. 41,323,000	ps. 42,285,000	—	ps. 962,000	Ord. Stk.	51½	41½	6	89½
	Buenos Ayres & Pacific ..	190	30.12.39	\$86,700	—	\$22,200	27	\$2,832,700	\$3,047,900	—	\$215,200	Ord. Stk.	51½	2	31½	Nil
	Buenos Aires Central ..	5,082	10.2.40	ps. 3,191,000	—	ps. 125,000	33	ps. 72,200,000	ps. 72,486,000	—	ps. 286,000	Ord. Stk.	14	8	12	Nil
	Buenos Ayres Gt. Southern ..	1,930	10.2.40	ps. 936,000	—	ps. 6,000	33	ps. 24,660,000	ps. 22,645,000	+	ps. 2,015,000	Ord. Stk.	135½	41½	4	Nil
	Buenos Ayres Western ..	3,700	10.2.40	ps. 1,648,800	—	ps. 927,450	33	ps. 57,501,900	ps. 59,608,700	—	ps. 2,106,800	"	101½	4	7	Nil
	Central Argentine ..	972	10.2.40	25,687	+	6,027	33	646,570	596,507	+	50,063	Ord. Stk.	114½	4	7	Nil
	Do. ..	188	Nov. 1939	16,055	—	1,709	21	88,364	112,640	—	24,276	Stk.	4	11½	3	Nil
	Cent. Uruguay of M. Video ..	70	Jan. 1940	12,200	—	1,100	4	12,200	13,300	—	1,100	Ord. Stk.	21½	71½	24	Nil
	Costa Rica ..	810	10.2.40	ps. 209,600	—	ps. 48,100	33	ps. 7,956,300	ps. 8,365,100	—	ps. 408,800	1 Mt. Db.	104½	102	102½	91½
	Entre Rios ..	1,016	10.2.40	14,500	+	2,500	6	80,500	72,700	+	7,800	Ord. Stk.	104½	102	102½	57½
	Great Western of Brazil ..	794	Dec. 1939	\$545,566	—	\$12,458	52	\$5,994,055	\$5,639,240	+	\$354,815	Ord. Sh.	6	3	1/2½	1½
	International of Cl. Amer.	22½	Jan. 1940	7,610	+	2,860	4	7,610	4,750	+	2,860	1st Pref	71½	71½	1½	Nil
	Interoceanic of Mexico ..	1,918	10.2.40	20,659	+	1,164	6	136,362	127,330	+	9,032	Stk.	7	61½	61½	Nil
	La Guaira & Caracas ..	483	14.1.40	\$284,100	+	\$7,300	2	\$527,300	\$530,200	—	\$2,900	Ord. Stk.	21½	1½	2	Nil
	Leopoldina ..	319	Dec. 1939	10,240	—	408	26	54,960	54,555	—	405	"	158	14	1½	Nil
	Mexican ..	386	15.2.40	10,536	+	5,291	6	29,203	14,118	+	15,085	Ord. Sh.	2½	1½	2	Nil
	Midland of Uruguay ..	274	10.2.40	\$2,649,000	—	\$325,000	33	\$102,861,000	\$100,228,000	—	\$2,633,000	Pr. Li. Stk.	218	11½	218	57½
	Nitrate ..	1,059	Jan. 1940	81,055	+	12,742	31	464,990	477,766	—	12,776	Prf.	451½	36	38	151½
	Paraguay Central ..	100	6.1.40	\$27,169	—	\$3,581	27	\$352,888	\$431,964	—	\$79,076	Pr. Li. Db.	151½	51½	31½	Nil
	Peruvian Corporation ..	153½	4.2.40	35,329	+	5,262	5	155,292	141,699	+	13,593	Ord. Stk.	19½	16	15	Nil
	Salvador ..	160	Dec. 1939	3,600	+	200	26	14,140	16,915	—	2,775	Ord. Sh.	38	6/6	11½	71½
	San Paulo ..	1,353	10.2.40	32,012	—	12,669	33	568,889	578,299	—	9,400	Ord. Stk.	58	2	14	1
	Taltal ..	73	Dec. 1939	1,432	+	185	26	6,222	6,478	—	256	Deb. Stk.	2	2	2	Nil
	United of Havana ..	17,169	14.2.40	592,800	+	153,000	6	3,677,000	2,836,400	+	830,600	Perp. Dbs.	743½	60	77	53½
	Uruguay Northern ..		—	—	—	—	—	—	—	—	—	4 p.c. Gar.	76	76	102	315½
	Canada	Canadian National ..	23,691	14.2.40	871,145	+	233,958	6	5,265,351	3,968,927	+	1,296,423	Ord. Stk.	78	31½	7
Canadian Northern ..		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
India	Grand Trunk ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Canadian Pacific ..	1,329	31.12.39	47,205	—	1,741	39	1,169,044	1,123,279	+	45,765	Ord. Stk.	761½	60	741½	4
	Assam Bengal ..	202	31.1.40	2,572	—	2,070	45	106,590	118,492	—	11,902	Ord. Sh.	561½	501½	45	87½
	Barsi Light ..	2,096	31.1.40	88,360	—	6,354	18	906,086	969,268	—	63,182	Ord. Stk.	277	229½	261	61½
	Bengal & North Western ..	161	31.1.40	3,872	—	467	45	121,701	128,050	—	6,349	"	91	84½	200	31½
	Bengal Doonars & Extension ..	3,267	31.1.40	265,425	+	29,083	45	6,580,841	5,827,187	+	753,654	"	943½	831½	891½	47½
	Bengal-Nagpur ..	2,986	10.2.40	248,250	—	26,250	47	7,693,200	7,606,950	+	86,250	"	108	90	102½	57½
	Bombay, Baroda & Cl. India ..	2,967	31.1.40	180,375	+	2,245	43	4,785,559	4,661,038	+	124,521	"	1041½	92	102½	75½
	Madras & Southern Mahratta ..	571	31.1.40	20,231	+	1,461	18	190,431	180,296	+	10,135	"	280	263	257	61½
	Rohilkund & Kumaon ..	2,531½	20.1.40	98,155	—	5,145	43	3,281,074	3,307,142	—	26,068	"	102½	88	91½	57½
Various	South Indian ..	204	Nov. 1939	82,028	—	—	8	154,004	—	—	—	—	—	—	—	—
	Beira ..	623	20.1.40	5,597	—	733	43	175,591	175,591	—	24	Prf. Sh.	1½	14	3½	Nil
	Egyptian Delta ..	1,625	May 1939	206,557	—	11,295	21	1,220,870	1,309,332	—	88,462	"	—	—	—	—
	Kenya & Uganda ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Manila ..	277	Nov. 1939	11,689	—	2,335	21	63,495	75,880	—	12,385	B. Deb.	55	39	46½	71½
	Midland of W. Australia ..	1,900	23.12.39	55,701	—	24,806	39	1,287,648	1,429,611	—	141,963	Inc. Deb.	91½	87½	88	49½
	Nigerian ..	2,442½	Nov. 1939	374,770	—	8	8	762,924	—	—	—	—	—	—	—	—
	Rhodesia ..	3,284	27.1.40	666,570	+	40,201	47	28,107,922	26,921,529	+	1,186,393	"	—	—	—	—
South Africa ..	4,774	Oct., 1939	871,621	+	43,492	17	3,049,244	3,064,925	—	15,681	"	—	—	—	—	
Victoria ..																

NOTE. Yields are based on the approximate current prices and are within a fraction of 1½ Argentine traffics are now given in pesos. † Receipts are calculated @ 1s. 6d. to the rupee.

§ ex dividend